All tutorial files can also be downloaded from: **www.3dartistonline.com/files**

www.3DArtistonline.com

3D Artist

68

Practical inspiration for the 3D community

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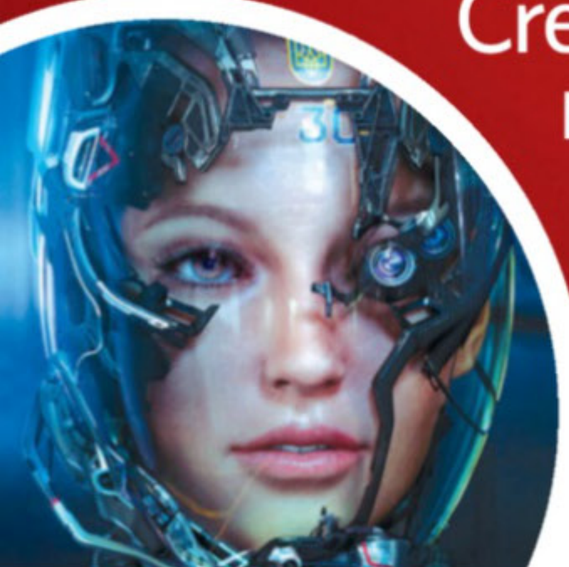

BEGINNER'S GUIDE TO TEXTURING

From the basics to the complex, master any texturing project

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ISSUE 068

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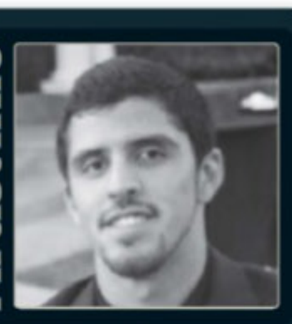
Artist info



Aldo Vicente

3DArtistonline
Username: AldoVicenteCG

Personal portfolio site
AldoVicenteCG.Wordpress.com

Country USA

Software used Maya, Photoshop

Textures are key to a great image, which is why we've turned the spotlight on them this issue. On p58 Daniele Orsetti discusses his professional MARI workflow, while Jahirul Amin goes in-depth on texturing on p82. You'll also find a beginner's guide to the texturing process over on p24. Time to get stuck in!

> "Our goal in this tutorial is to learn how to observe and understand reflections to re-create virtually any material type quickly and effectively"

Aldo Vicente on his mental ray process **Page 50**

Master reflections

page 50

With the Disc

Tutorial files:
- Tutorial video

Welcome

to the magazine and 116 pages of amazing 3D

Hello and welcome to 3D Artist magazine! Textures are key to bringing a project closer to realism – they have the power to turn a simple sphere into a detailed planet, or a bland model into a photoreal human. That's why we've focused so much on the art of texturing this issue, with an intro to the craft starting on p24, and tutorials on p58 and p82. Don't miss the knight tutorial on p50 either, where Aldo Vicente reveals his workflow for realistic materials and reflections!

Chris Editor

Every issue you can count on...

1. **Exclusively commissioned art**
2. Behind-the-scenes guides to images and fantastic artwork
3. **A CD packed full of creative goodness**
4. Interviews with inspirational artists
5. **Tips for studying 3D or getting work in the industry**
6. The chance to see your art in the mag!

This issue's team of expert artists...

Aldo Vicente

Aldo's back! This time he's focusing on the art of reflections, using his stout-looking knight as a prime example (p50)

Daniele Orsetti

MPC texture artist Daniele goes in-depth on the professional MARI workflow he uses day by day (p58)

Mike Jagodzinksi

An expert in all things hard-surface, Mike looks at modelling using MODO's latest features (p66)

Gleb Alexandrov

Blender pro Gleb reveals the intricate processes behind his photoreal image Brushes (p72)

Eric Rosenthal

FX animator Eric discusses adding fire trails to your vehicles using a straightforward process (p78)

Jahirul Amin

In part two of his Maya tutorial, Jahirul moves onto the texturing phase for his cuttlefish model (p82)

Angelo Fernandes

Want to use 3ds Max particles in an interesting and innovative way? Angelo reveals all (p90)

Michael Levine

FX and simulation TD Michael takes a look at ZBrush fibres and how you can easily import them into Maya (p92)

Orestis Bastounis

This issue Orestis takes a look at the recently revealed AMD W9100 (p96) and the Dell M4800 (p99)

Paul Hellard

Paul considers how previsualisation is becoming more than just a simple prepping process (p42)

Paul Champion

Paul chats to director Paul W.S. Anderson about his latest film *Pompeii*, and his ideas on VFX today (p106)

Ellen Wolff

Ellen talks with 3D scanning studio Ten24 to learn how new processes are shaping the industry (p108)

Sign up, share your art and chat to other artists at www.3dartistonline.com

3DArtist

Imagine Publishing Ltd
Richmond House, 33 Richmond Hill
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Magazine team

Editor Chris McMahon
chris.mcmahon@imagine-publishing.co.uk
☏ 01202 586239
Editor in Chief Dan Hutchinson
Senior Staff Writer Larissa Mori
Production Editor Philippa Grafton
Senior Designer Chris Christoforidis
Photographer James Sheppard
Senior Art Editor Duncan Crook
Publishing Director Aaron Asadi
Head of Design Ross Andrews

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Contributors
Gleb Alexandrov, Jahirul Amin, Orestis Bastounis, Paul Champion, Angelo Fernandes, Paul Hellard, Mike Jagodzinksi, Michael Levine, Daniele Orsetti, Eric Rosenthal, Aldo Vicente, Caroline Watson, Ellen Wolff.

Advertising
Digital or printed media packs are available on request.
Advertising Director Matthew Balch ☏ 01202 586437
matthew.balch@imagine-publishing.co.uk
Head of Sales Hang Deretz ☏ 01202 586442
hang.deretz@imagine-publishing.co.uk
Advertising Manager Alex Carnegie ☏ 01202 586430
alex.carnegie@imagine-publishing.co.uk
Account Manager Ryan Ward ☏ 01202 586415
ryan.ward@imagine-publishing.co.uk

Cover disc
Junior Web Designer Steven Usher
3daxtrahelp@imagine-publishing.co.uk

International
3D Artist is available for licensing. Contact the International department to discuss partnership opportunities.
Head of International Licensing Cathy Blackman
☏ +44 (0) 1202 586401
licensing@imagine-publishing.co.uk

Subscriptions
Head of Subscriptions Gill Lambert
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Circulation
Head of Circulation Darren Pearce ☏ 01202 586200

Production
Production Director Jane Hawkins ☏ 01202 586200

Founders
Group Managing Director Damian Butt
Group Finance & Commercial Director Steven Boyd

Printing & Distribution
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Image - Khalid Al-Muharraqi

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Khalid Al-Muharraqi is an artist in every sense of the word—it runs in his family. Khalid and his father Abdulla Al-Muharraqi were recently honored with a father and son art exhibit in Bahrain, opened by His Royal Highness, the Prime Minister of the Kingdom of Bahrain. LightWave 3D is essential software for Khalid's craft—transforming ideas into art that is revered worldwide.

"LightWave 3D is the tool that helps me create the images in my head. I use a variety of 3D applications, but LightWave 3D is always the backbone of my work. It has tools that make sense to me and allow me to reach my artistic goals." -- Khalid Al-Muharraqi

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INSIDE ISSUE SIXTY-EIGHT

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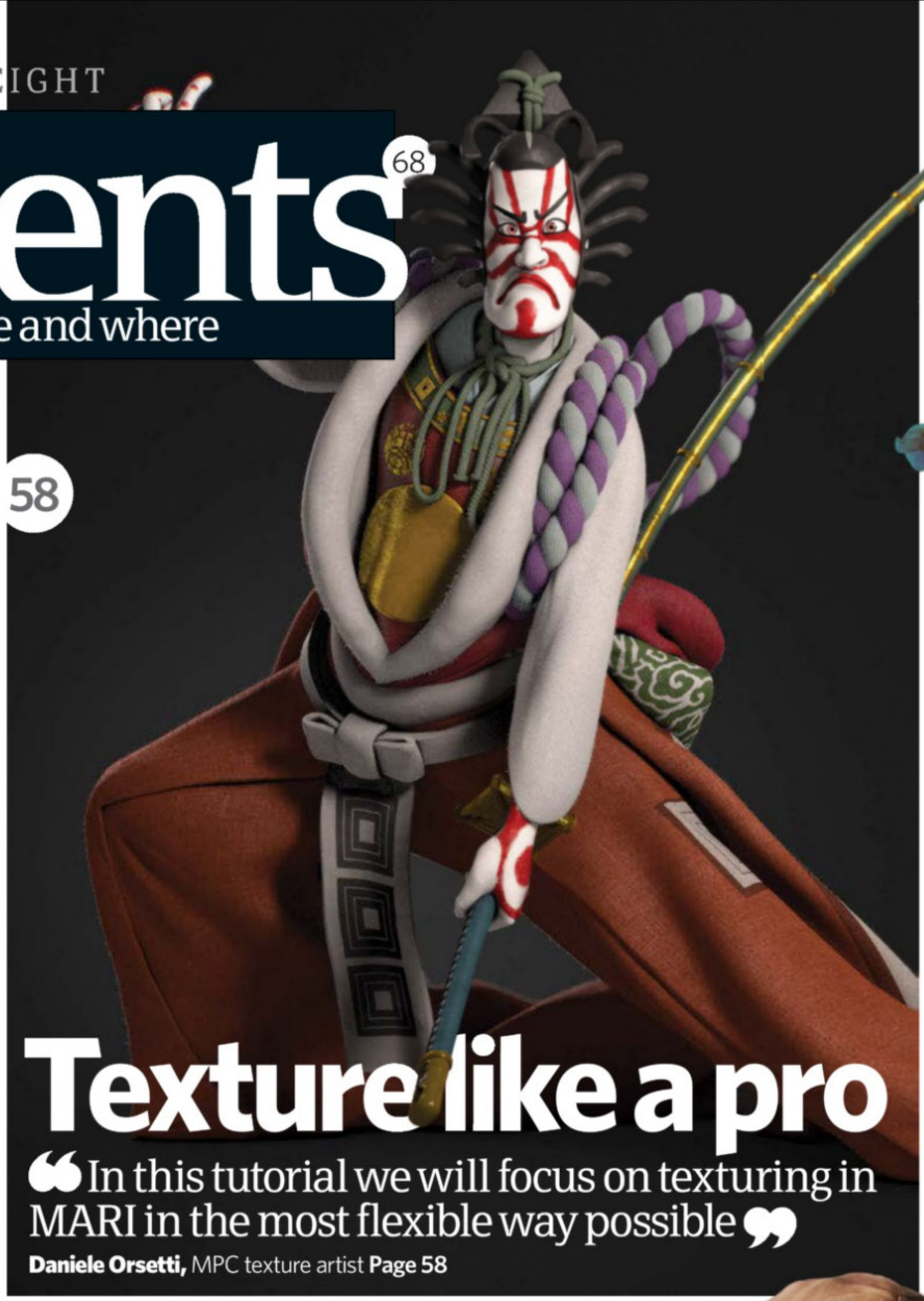
96 Review: AMD W9100
Orestis Bastounis takes a look at the latest entry into the AMD range

99 Review: Dell M4800
Could this mobile workstation be your portable tool of choice?

101 Review: Smart Skinner
Read the review then try out the 30-day trial included with the disc



Texture like a pro

"In this tutorial we will focus on texturing in MARI in the most flexible way possible"

Daniele Orsetti, MPC texture artist **Page 58**

Free tutorial files available at:
www.3dartistonline.com/files

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Turn to page 88 for details

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Texture a cuttlefish

Create fire trails

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Professional 3D advice, techniques and tutorials

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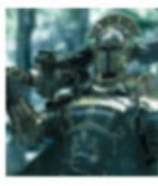
Witness Yujong Wang's incredible sculpting techniques on show in this fantasy creature

50 Step by step: Create convincing reflections
Aldo Vicente reveals how he adds detail to his characters



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Kimmo Kaunela recalls Alfonso Cuarón's space-based epic in this beautifully rendered piece

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MPC's Daniele Orsetti showcases his MARI techniques

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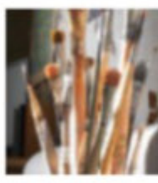

95 I Made This: Geek Room
Oscar Perez Ayala creates an image that looks all too similar to the **3D Artist** Editor's bedroom!

"Learn how to build a Cobra helicopter for your next-gen game project"

Mike Jagodzinski discusses new MODO techniques **Page 66**

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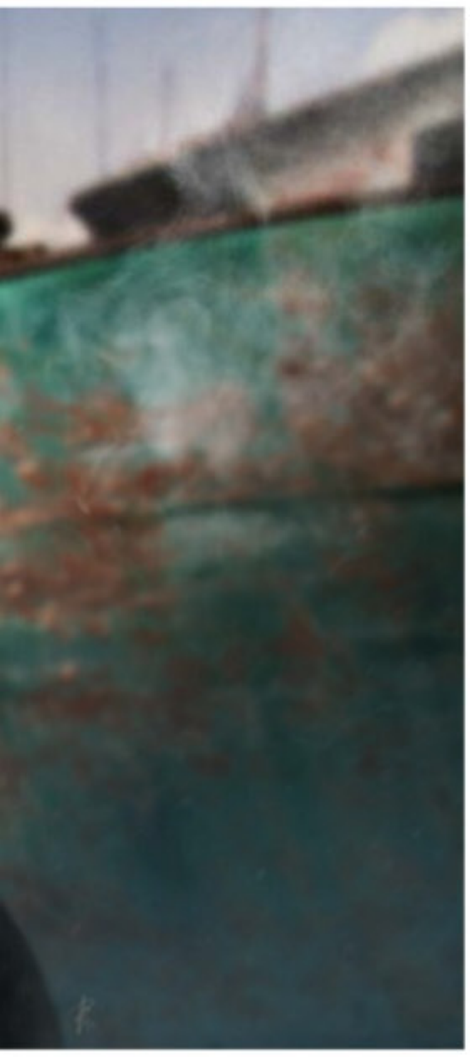

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Expert tuition to improve your skills

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Simulate a *Back To The Future* style effect behind your vehicles

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Bring your cuttlefish to life in the second part of this series

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How a focus on the basics can turn you into an expert

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- **CGTrader Porsche model**

Turn to page 112 for the complete list of the disc's contents

WELCOME TO

THE GALLERY

Seven pages of great artwork from the 3D community

Images we love!

> I was inspired to make this car by the Avengers TV series, as John Steed drives a 4.5 litre in some episodes. I'm a big fan of vintage cars!
>
> **César Vonc,** *Bentley 4.5 litre,* 2013

> Coming from a hobbyist this is extremely impressive work and just goes to show what Octane Render is capable of
>
>
>
> **Chris** Editor

Artist info

César Vonc

César is an artist living in Paris. He is studying programming and does 3D art as a hobby

Personal portfolio site
http://cesar.vonc.fr

Country France

Software used
CINEMA 4D, Octane Render

Work in progress...

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Or get in touch... 3dartist@imagine-publishing.co.uk @3DArtist Facebook.com/3DArtistMagazine

> This wouldn't look out of place in the next *Hobbit* film whatsoever! Some great talent on show here
>
> **Chris** Editor

Artist info

Derrick Song Weng Foong

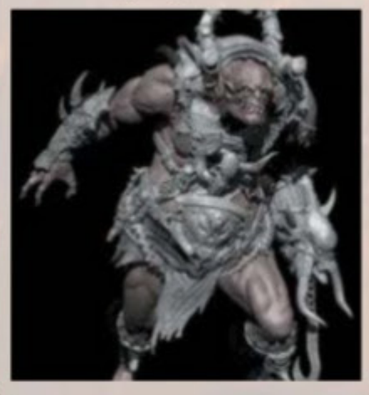
Derrick is an art lecturer and teacher at the 3Dsense Media School based in Singapore

Personal portfolio site www.derricksong-artblog.blogspot.sg

Country Singapore

Software used
ZBrush, Softimage, Photoshop

Work in progress...



> I created this image for the CGHub creature challenge. As well as taking part in the challenge, I wanted to show some of my workflow and share the asset I'd created with the students in my school
>
> **Derrick Song Weng Foong,** *CGHub Orc Challenge*, 2014

Artist info

Reinier Reynhout

3DArtistonline

Username: reinierreynhout

Personal portfolio site
www.reynhout.eu

Country The Netherlands

Software used
3ds Max, V-Ray, Lightroom

Work in progress...

“I'm currently visualising the renovation of a Dutch farmhouse and for every room I make, I want to render detail shots. The lighting is based on the real position of the Sun. There are no extra lights, just an HDRI map”

Reinier Reynhout, *Detail dining 01*, 2014

“It's fascinating to see how Reinier has taken the time to render not just the architecture in his scenes, but also separate details such this tea set”

Larissa Staff Writer

> When I was studying mental ray, I saw the film *Kingdom Of Heaven*. I was fascinated by the character Sibylla, so decided to try to render her
>
> **Bongsu Lee,** *Kingdom of Heaven,* 2014

> The materials are what strikes us here. You can almost feel the material of the silk and the embroidered patterns stitched into it
>
> **Chris** Editor

Artist info

Bongsu Lee

Bongsu worked for an online games company in Korea and currently works as a freelancer

Personal portfolio site
www.vitan2.blog.me

Country South Korea

Software used
3ds Max, ZBrush, Photoshop

Work in progress...

“I created this work in my spare time. The idea came from a *Warhammer* sketch online, which I then added to with my own ideas. I tried out a variety of new software while creating this image”

Andrey Alexandrovich Serebryakov, *Watermill*, 2009

Artist info

Andrey Alexandrovich Serebryakov

Andrey has been worked in the 3D industry for five years and has worked on several titles

Personal portfolio site http://silvertm.ru

Country Russia

Software used 3ds Max, V-Ray, EarthSculptor, Onyx Tree Storm

Work in progress...

“We love how this image feels like a 3D diorama, full of small details that become apparent when you look close enough”

Chris Editor

> This captivating character is a great example of what can be achieved using just CINEMA 4D. We love the use of lighting too!

Larissa Staff Writer

> This work was made for my entry to the Comicon 2014 competition. I was very impressed and inspired by the manga *Blame!* by Nihei Tsutomu, and the competition was a great opportunity to gain skills and experience

Roman Makarenko, *Blame!*, 2014

Artist info

Roman Makarenko

3DArtist online

Username: romale

Personal portfolio site
www.behance.net/romale

Country Ukraine

Software used CINEMA 4D

Work in progress...

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Polovsak was invited to produce the vibrant crashing animations for the recent Wacom Cintiq Companion tablet ad Design: Frame.dk (Santi Zoraidez) & Sebastian Onufszak, Animation and post-production: Frame.dk

Expert freelance tips

We speak to four successful 3D freelancers to discover more about getting your work noticed

Mariano Pellegrini Steiner
/ The character artist
Website www.marianosteiner.com
Clients Crytek, Plastic Wax, MCFarlane toys, Bigshot toys, Techno Image, Cinevision FX

Amaan Akram / The lighting and rendering sup
Website www.amaanakram.com
Clients The Mill, MPC, Film department Men From Mars

Rob Watkins
/ The environment artist
Website www.wokosworld.com
Clients Virgin Media, Microsoft, Disney, Future Systems and Norman Foster Associates

Nejc Polovsak
/ The animator
Website www.twistedpoly.com
Clients Adobe, Wacom, HBO, Nike and Audi

Mariano Pellegrini Steiner

- Personal work is where you develop yourself. If you do personal projects, you learn with them and you can fail with them. When you get a real job, you already know what to do.
- Based on my experience, freelancing is all about timing. If you start too soon and with too little experience, you will fail because you simply don't know how to work yet. If you start too late, you might feel too uncomfortable with the paycheck variations.
- Being a freelancer is a blast! You can expect all kinds of projects, from small to super-famous companies. Sometimes you have plenty of projects to work on at once, but sometimes there are no projects at all for a couple of months. One tip is to never spend too much money. You never know when you're going to get your next paycheck!

Amaan Akram

- A website that showcases your best work is a must. I think it's the ideal way to give a quick introduction to your work to someone looking to hire. Also, have a LinkedIn profile to go alongside your website. It's equally important to have that work visible to the community and to interact with it via forums and mailing lists. In fact, these days I mostly stay on mailing lists.
- I was lucky to be offered a job in this industry when I was starting out – it's a struggle for many people these days, but I got to work on my skills before stepping out as a freelancer. That way, I had some production experience under my belt and that helped me in building up some high-profile work. I have a lot of friends in the industry who are all former colleagues with a lot of shared experiences of different projects. I also tend to be active on mailing lists, writing tools and releasing them for free. This helps me stay relevant, and in some way lets me give something back to the wider community that I owe my career to.
- Anyone interested in lighting and rendering would need to have a solid foundation in traditional art disciplines, such as colour and composition. Make sure you know about rendering theory and its practical application in rendering engines.

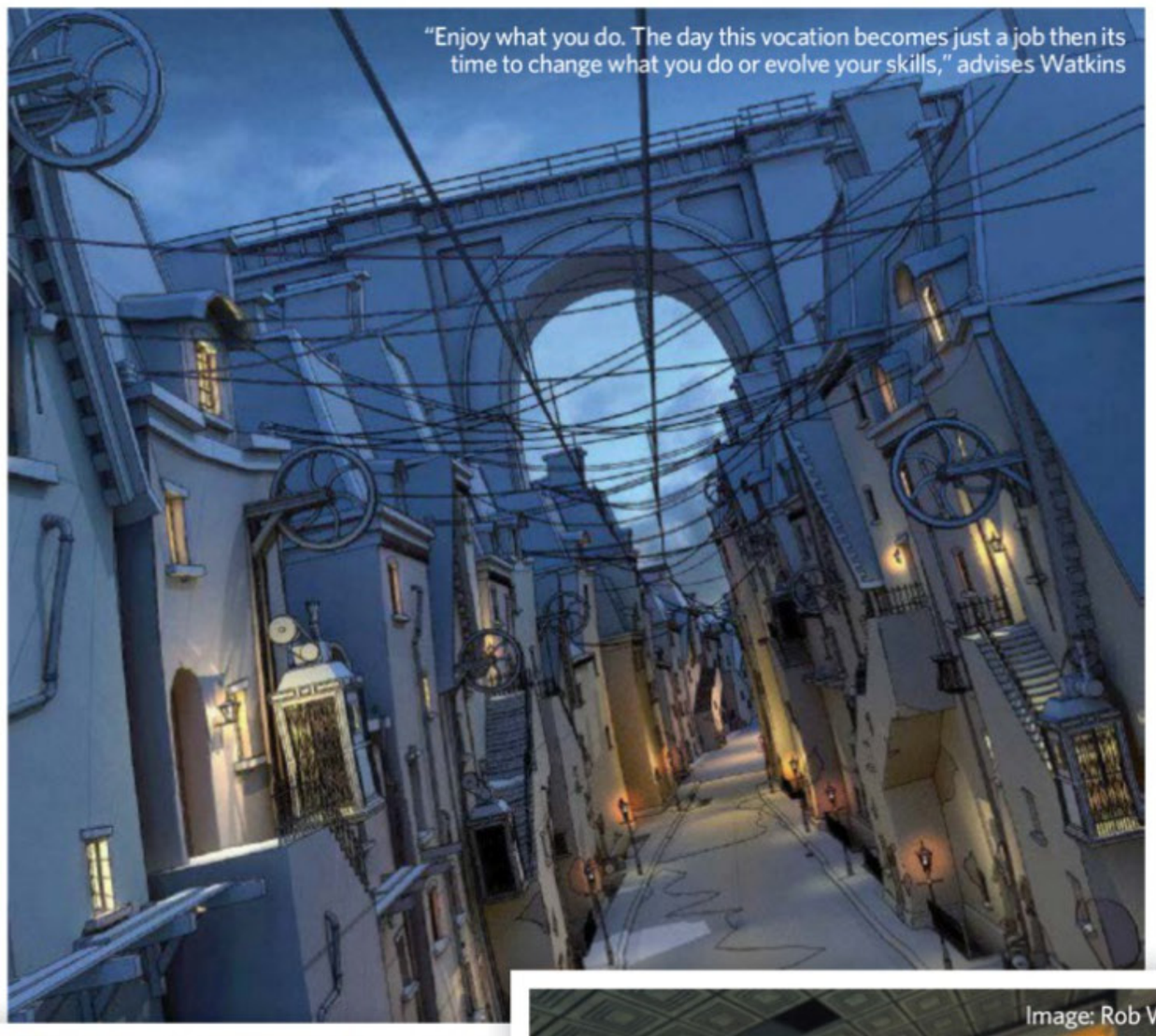
Work by Steiner on Crytek's *Ryse: Son of Rome*. To get your work noticed, Steiner recommends focusing portfolios on the area you want to specialise in and then posting work everywhere, from social media sites to forums

Rob Watkins

- Perhaps the most important advice I can give to any aspiring freelance artist trying to break into the CG industry is to keep your portfolio up to date. If you are targeting a specific discipline within the industry, such as character or environment art, make sure your folio reflects this. If it doesn't, then don't be surprised if you don't get the jobs you really want!
- Charging is always a grey area. I tend to charge for a daily rate, which is generally considered as eight hours of work a day. I then work out how many days the job is going to take to complete, and put this down in a detailed, broken down invoice. Occasionally some clients will ask you to do a free sample. If there isn't anything in your folio that reflects these skills then you can offer to undertake a small test for them. However, as a rule, never offer to work for free as this rarely leads to paid work.
- I also recommend supplying or agreeing a delivery schedule that you sign off as you go. I often break this down into several deliverables: camera composition, model silhouette, lighting and materials/shaders, depending on the job and whether it's concept or an in-game asset. Doing this is also a good way of instilling confidence in your client. It shows you are professional about your work and deliverables.

Nejc Polovsak

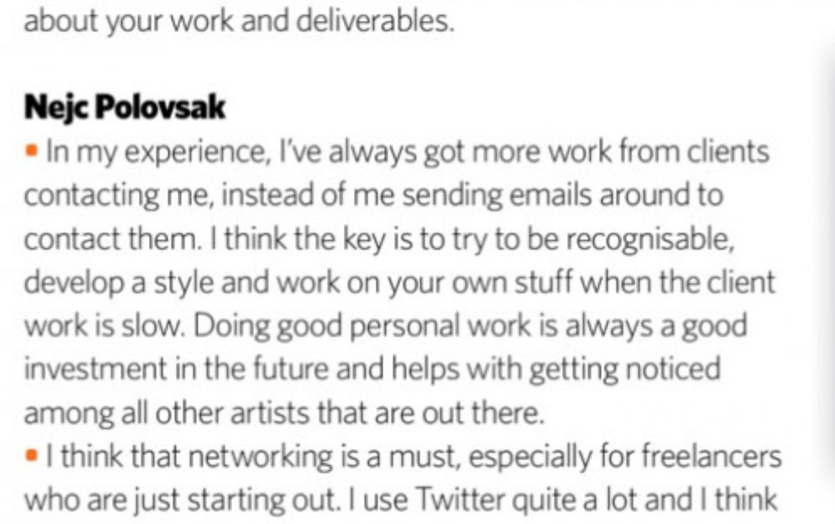
- In my experience, I've always got more work from clients contacting me, instead of me sending emails around to contact them. I think the key is to try to be recognisable, develop a style and work on your own stuff when the client work is slow. Doing good personal work is always a good investment in the future and helps with getting noticed among all other artists that are out there.
- I think that networking is a must, especially for freelancers who are just starting out. I use Twitter quite a lot and I think it's a great tool to connect with other people that are in the same industry. In the past I've gotten projects just through knowing people on Twitter, or because other people knew that I'm out there.
- Before going freelance, you absolutely must make sure that you've got a decent portfolio that shows what you can do, plus a network of people, studios or potential clients that could give you work. It's also good to have money saved up for a few months in advance, just in case things don't work out, or when work is slow in the beginning. Be prepared to do a lot of things that are not actual work. That would be just networking, dealing with the business side of freelancing and writing lots of emails, which can take up quite a lot of time.



"Enjoy what you do. The day this vocation becomes just a job then its time to change what you do or evolve your skills," advises Watkins

A physical Sun and sky shader written by Akram for Arnold

Image: Rob Watkins



To keep your portfolio fresh and up to date, work on personal projects when paid projects are slow. Image: Rob Watkins

"Being a freelancer is a blast! You can expect all kinds of projects, from small to super-famous companies"

Mariano Pellegrini Steiner

Image: Mariano Steiner

Image: Nejc Polovsak

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If you want to get your hands on this bumper 3D compilation, then all you need to do is head to our website at www.3dartistonline.com and answer the following question:

For which film was MARI first developed?

a) Avatar
b) Hugo
c) Gravity

Entry for the competition closes on 17 June 2014.

About The Creation COLLECTIVE

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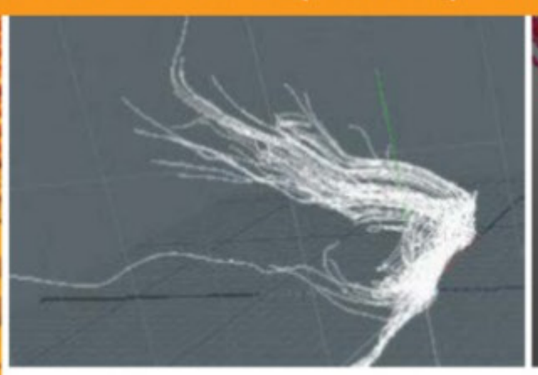

CREATION COLLECTIVE.

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Images of the month

These are the illustrations that have been awarded 'Image of the week' on 3DArtistOnline.com in the last month

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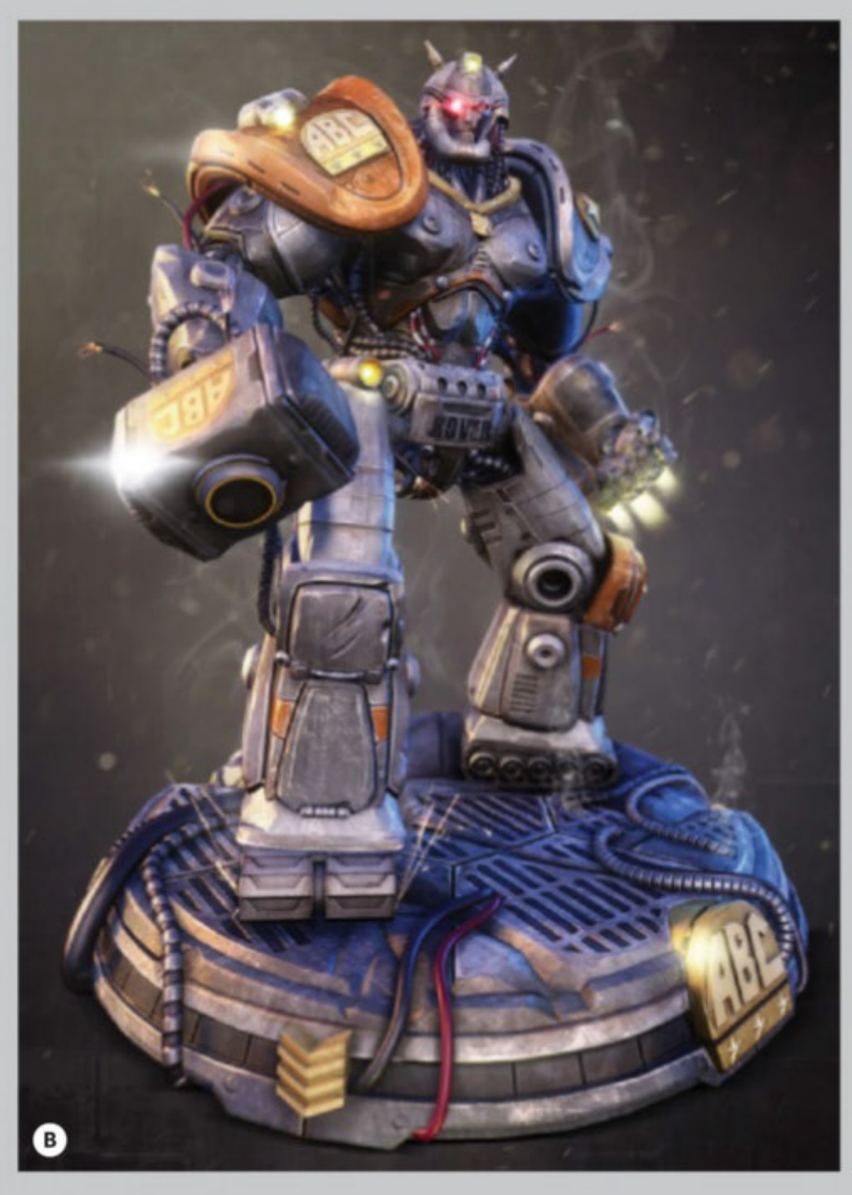
to view the art and chat to the artists

Ⓐ The Last Goldfish
» **Nikita Siemens**
3DA username Stollentroll1984
Nikita says: "Both these cats are my house cats, so I decided to create an image with them as the protagonists. I used Maya and ZBrush, with the hair and fur created with Shave and a Haircut in Maya. This was the most extensive part of the work. I used Arnold for Maya to render."
We say: *We love the seriously intense looks on both the cats' faces – you can almost see them plotting away. For some reason, we get the feeling that this goldfish is not long for this world...*

Ⓑ Hammerstein
» **Victoria Passariello**
3DA username Vitrux
Victoria says: "I created this character – Hammerstein, from the ABC Warriors comic – for the Comicon Challenge 2014."
We say: *We absolutely love the specular highlights and use of colour on this robot, as well as the worn and scratched textures. It really makes it stand out from the crowd. It's a great reminder that not every robot needs to be grey and serious in order to be successful!*

Ⓒ The Meal
» **Mike Zhang**
3DA username mik3zhang
Mike says: "This is a lighting and shading study created for my Arnold class at Gnomon with Stephen Delalla. It was rendered in Maya with Arnold and then it was composited in NUKE."
We say: *With Arnold becoming increasingly popular, we're seeing more and more fantastic images being produced using it. This example is no exception – the sushi is lit so well that we feel like we could almost reach out and grab a bite.*

Ⓓ Wilderness
» **Riyad Hasan**
3DA username riyad14
Riyad says: "This is a personal work that I finished recently. I hope you like it! I used ZBrush, MARI, Maya, V-Ray, Photoshop and NUKE."
We say: *There's a pleasant atmosphere to this image, thanks to the soft lighting and the gentle arc of the rock over the water. We can't decide if this is from a place on Earth, or a scene from some idyllic alien environment.*



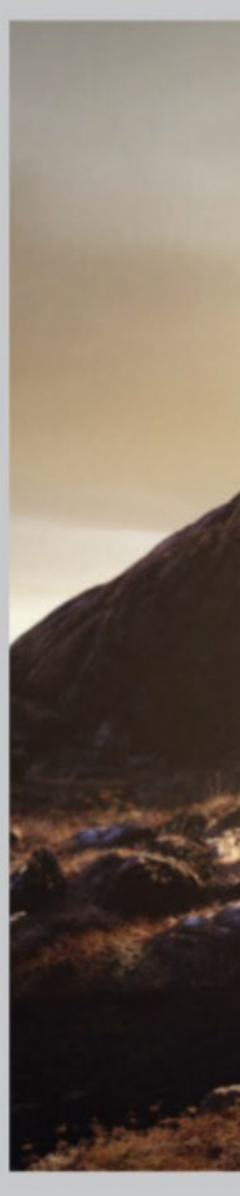


Image of the month

Water Bear

» **Nicolas Delille**

3DA username ModernAgeStudio

Nicolas says: "The water bear, or tardigrade, is a water-dwelling, segmented micro-animal with eight legs, best known for its amazing abilities to survive in space and withstand extreme temperatures. Best of all, I love his face!"

We say: *If you've had a look at* ***3D Artist*** *issue 66 then you'll have seen Nicolas' work before in the form of a tarantula. It seems nothing in nature is of limits to Nicolas, considering this excellent rendering of an extremophile organism!*

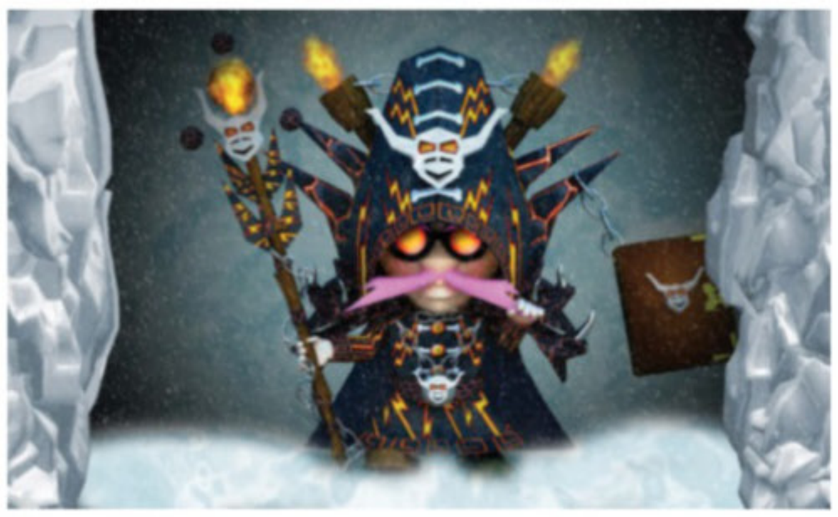
Officer

» **Leo Sakamoto**

3DA username leo5809

Leo says: "This is my first project of 2014. It's my attempt to create a realistic portrait of an elderly person. It was modelled and textured in ZBrush and Photoshop and rendered in V-Ray for 3ds Max."

We say: *Making a human face feel unique and believable is no easy task, but Leo has certainly pulled it off here. You can read the quiet pride on this soldier's face.*



Gnome Warlock

» **Philip Bilenberg Pedersen**

3DA username Balrog28

Philip says: "I've always been a huge fan of Blizzard's work, especially the *World Of Warcraft* characters, so I decided to make my own gnome warlock in 3ds Max and V-Ray. This was my first attempt at painting textures, and probably not my last."

We say: *We certainly hope not Philip, as this is a great first attempt. We can't wait to see how your painted textures develop in future with practice.*

Reptile Knight

» **Danie Malan**

3DA username cnever

Danie says: "It had been a while since I did a sculpt, so I decided to do a personal project focusing on organic shapes. Instead of following a plan, I just went with it!"

We say: *Sometimes it's best to start a project with no clear idea and just let your creativity run free. As Danie has proven with this example, your brain will often come up with some really unique looks.*

Have your say

Email, Tweet or get in touch with us on Facebook to share your thoughts, opinions and proudest projects

Top tweets

Get involved... @3DArtist

@3DArtist A Chinese company has used huge 3D printers to create ten houses in one day.
@blackenise And they laughed at me when I said we can print houses! #owned

@3DArtist Check out the new Cycles 2014 showreel from The Blender Foundation!
@Artengame WOW, thanks for that. I mainly use Blender and this is very exciting indeed.

@3DArtist Epic VFX breakdown revealing Blur's work on *Thor 2*!
@3dsJamiesJewels I never realised so much was CG!

On the Wall

Facebook.com/3DArtistMagazine

Check out this amazing Robert De Niro sculpt created for the CGFeedback likeness challenge by Hossein Diba!

Jonathan Webb That looks like a ZBrush sculpt on the left and a photo on the right. Amazing!

Ouzair Hafeez Look at all those polygons.

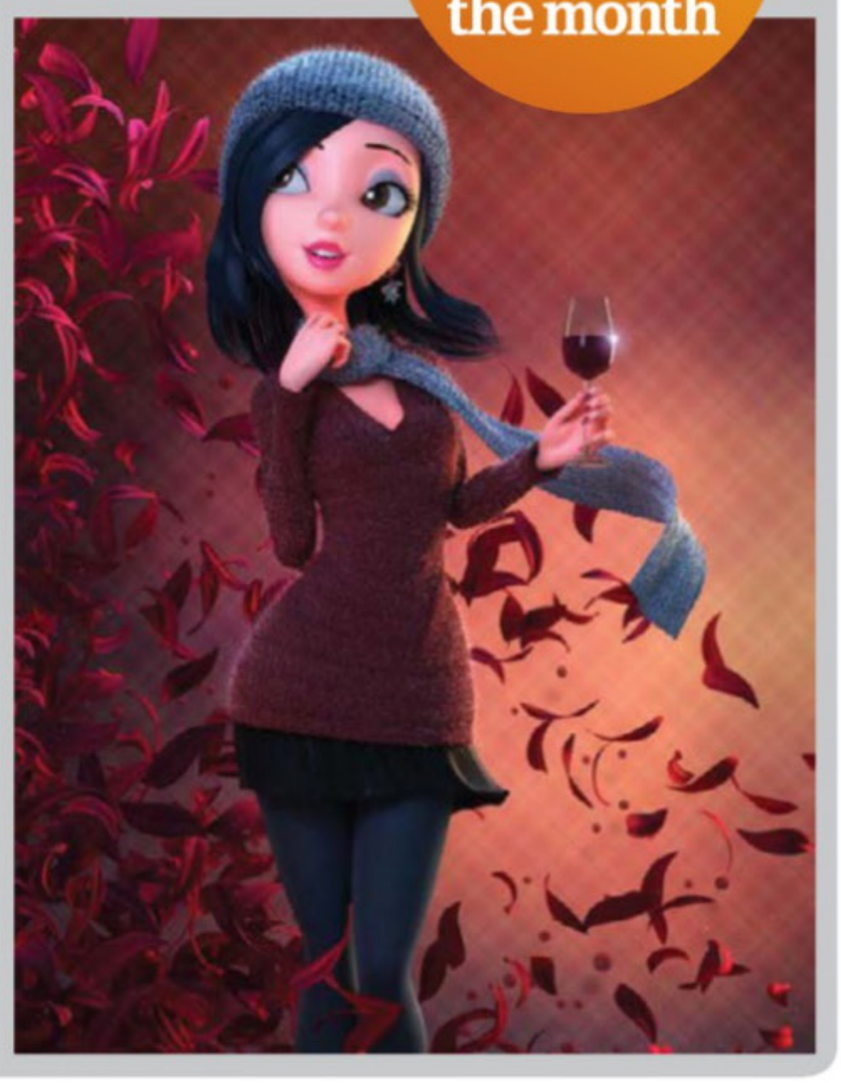
Steve Jones That's the bar raised again! The standard of the model is amazing.

If you want to have your work or thoughts displayed here, get in touch with us via email at **3dartist@imagine-publishing.co.uk**, via Facebook at **facebook.com/3DArtistMagazine** or on Twitter **@3DArtist**

Social media images of the month

Monster Hunter
» **ishikawa_cg** • http://tinyurl.com/3DAishikawacg
We say: *Dragons are pretty popular among 3D artists, so it's hard to make them unique. Ishikawa_cg from the ZBrush Central forums has done just that, though, with thorny scales that give this creature character.*

Cheers!
» **Carlos Ortega Elizalde** • http://carlosortega.prosite.com
We say: *We've always loved Carlos' work, and this is no different. He always makes his characters shine with some great compositional elements, like the use of wind to blow the autumnal leaves and scarf to the right.*



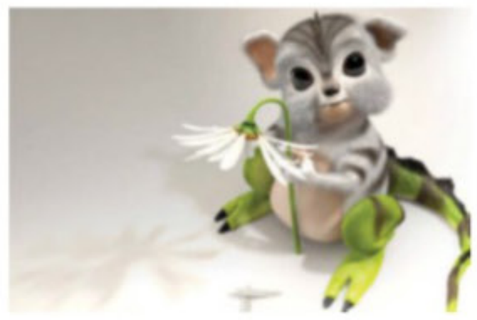
Samurai CG

Hello, I followed your tutorial by Hasan Bajramovic from issue 58 to create this samurai. His name is Miyamoto Musashi. I used ZBrush for the samurai, 3ds Max for the castle and texturing, and Photoshop for the cherry tree and lighting. Many thanks,

Antoine Raymond Pavia, via Facebook

Thanks for sending this over Antoine! We're always thrilled to see what our readers come up with after following our tutorials. We hope that you gained some useful new skills in the process. Another thing we love is that you extended this image with the architecture and mountain in the background – it really helps to set the scene.

YOUR TOP WALL POSTS



Zebrastriped Squirrelguana
» **Eric Narad**
www.vitaminestudio.com
Eric says: "This was a project that I worked on in my leisure time. It was created using 3ds Max, V-Ray and Photoshop."

Shark Cage
» **Daniel Odland** • www.strangeworldmedia.com
Daniel says: "This was from a project I did to explore MODO and its wonderful array of texturing tools. Of course, the shark is named Bruce!"

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***Buda Repossession* by Farkas echo Zsolt**
"Texturing was the fun part," says Zsolt. "I could go with two options – repaint each character separately, or break up the whole composition to layers. Either way works, so I chose the second one. I painted an extra eight colour maps, eight bump maps, four reflection maps, four specular maps and four normal maps"

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> It's a tremendous amount of hard work, time and effort, but we all do this because we love it
>
> **Justin Holt**

A BEGINNER'S GUIDE TO TEXTURING

From a base material to a fully textured object, we break down texturing in this essential guide

A BEGINNER'S GUIDE TO TEXTURING

I simply cannot think of anything I'd rather be doing than painting textures for amazing characters and creatures in the feature film industry," begins lead texture painter at Image Engine, Justin Holt. Years ago, Holt took a leap of faith and left a pre-med program to transfer to the Savannah College of Art and Design, where he pursued his dream of working in visual effects. Now, with experience at Image Engine, MPC, ILM, and Digital Domain, he's at the top of his game.

If Holt's career sounds ideal, you are certainly not alone. Texturing is an inherently fascinating part of the pipeline – textures that have been properly created and applied can turn even the most bland chunks of geometry into a realistic prop. A simple cube can become an old crate of rusty metal, while a plastic-looking character model can be transformed into a hyper-realistic human. Texturing is about so much more than simply applying an image to a model – there's an art to this crucial process that can take years to master.

"It's very hard to make a 3D object look realistic with just one map," confirms Dorothy Ballarini, senior modeller and texture painter at Method Studios. "Objects in real life are complex. They are affected by the lighting, by the weather and many other different factors. These peculiarities are so present in reality that the lack of them makes it easy to spot when something is CG in a scene. To make things look real, they need flaws."

It's because of these flaws, in fact, that texture artists need to create not one, but a wide variety of specialised textures, each with their own unique uses and effects, which can then be applied to a surface of a 3D object. In order to do this, each texture is connected to specific channels within a shader, resulting in a combination of all the different texture maps created – what we call the material.

For Holt, this is the work he feels very grateful to do every day. "I never take a day I work for granted and I never will," he says with a smile. "I cannot say that it isn't a dream come true, but it is also a tremendous amount of hard work, time and effort that I don't think many aspiring artists understand. We aren't getting famous here and we aren't getting rich. We all do this because we love it."

MODELLING AND UVS

"A typical day involves working closely with quite a few other people in the studio," begins texture lead at MPC, Leigh van der Byl. "On the downstream, we collaborate with the modellers to find optimum UV layouts for the texture resolutions the work requires and on the upstream we deal directly with the artists in look-dev, who are plugging all our texture maps into shaders." As a geometry-based task, UV maps are generally created by the modelling team in large studios. It remains a crucial step in the texturing process – even with the rise of 3D painting apps like MARI, many texture artists will still perform much of their work in the flat UV view.

After receiving a 3D asset, the UVs need to be properly prepared – a process that involves UV mapping, or literally unfolding or flattening the 3D model into a 2D plane. "This method is used so the textures can be painted in a plane and then essentially wrapped back onto the 3D model," says Ballarini. "This has to be carefully planned as any mistake found later on in the project – such as a UV stretching or overlapping – can lead to hours wasted on retexturing."

In film VFX, the process can be incredibly complex. A major asset, such as a large spaceship, could be split out over hundreds of UV tiles, each with a set of 4k to 8k textures applied to ensure that they are of a high enough resolution to look impressive on the big screen. In videogames, Ballarini tells us, the way in which an artist chooses to handle the UVs is of vital importance when it comes to saving memory space. "Many game characters, for example, have their UVs mirrored in order to make use of a larger area in UV space," she explains. "This allows for more details to be painted on the texture."

Luckily, most 3D software today offers tools to unwrap UVs. There are even a multitude of stand-alone applications and plug-ins, such as UVLayout or Unfold3D, which have been developed exclusively to perform the task. Once the model has been UVed, it's passed over to the texturing team to get started on all the maps needed to drive almost any channel in the final material.

> "It's very hard to make a 3D object look realistic with just one map"
>
> **Dorothy Ballarini**

Dorothy Ballarini
www.dorothyballarini.carbonmade.com

Current: Senior modeller and texture painter at Method Studios

Previous: Modeller and texturer at MPC, lead 3D character artist at Ubisoft

Key projects:
Prometheus, World War Z

Leigh van der Byl
www.leighvanderbyl.com

Current: Texture artist and texture lead at MPC

Previous: Texture artist at Framestore, texture artist at Double Negative

Key projects:
Exodus: Gods and Kings, Godzilla, Maleficent, The Amazing Spider-Man 2, Game of Thrones, Gravity

Justin Holt
www.justinmichaelholt.com

Current: Lead texture painter at Image Engine

Previous: Senior texture painter at Digital Domain, senior view painter at ILM, lead texture painter at MPC

Key projects:
Teenage Mutant Ninja Turtles, Elysium, White House Down, Now You See Me, Watchmen, The Golden Compass

Justin Marshall
www.digitaltutors.com

Tutor and texturing expert at Digital Tutors

Key info:
Digital-Tutors provides artists of all levels with industry-proven training for the entire 3D pipeline - from modelling to texturing to rendering. Learn direct from creative professionals in every video tutorial

Ben Neall
www.bneall.blogspot.co.uk

Current: Lead texture artist at Method Studios

Previous: Lead texture artist at Digital Domain, senior texture artist at Rhythm & Hues

Key projects:
Into the Storm, Maleficent, Divergent, Iron Man 3, Transformers, Star Trek

Paul Nelson
www.paul-nelson.com

Current: Lead modelling and texturing TD at MPC.

Previous: Lead character artist at Sony Computer Entertainment Europe

Key projects:
Guardians of the Galaxy, Maleficent, The Seventh Son, World War Z, Total Recall, Prometheus, Life of Pi

Advice for beginners from Justin Holt

"My biggest piece of advice for any aspiring texture painter is to keep in mind the type of work you likely will be painting when entering in as a junior painter. I see too many reels that have students attempting far too much and ultimately everything in the reel is sub par.

As a junior texture painter, you will likely be painting background assets and potentially mid-ground assets. Cater your reel to the hero versions of this type of work. Simple is better. People reviewing your work want to see that you understand surface qualities and how they relate to creating photoreal results. Focus on projects that give you 50 per cent or more of your time painting textures and developing finessed turntable renders of your work in various lighting environments.

Furthermore, I recommend you learn to model and look-dev your own work. If you are hell-bent on doing hero creature or character texture work for your reel, you must make sure the model is feature film quality or you will be wasting your time. A bad model can ruin everything!"

"Go online and find models that you love created by modellers in the CG Community and see if they would be willing to collaborate," says Holt. "That is how I was able to team up with Steve Lord, Bruno Melo and Ben Eoff for my Gnomon Texture Titles and CGWorkshop courses

Texture tips
by Justin Marshall

IS MY MODEL READY?

Before you start texturing your model, it's a good idea to check for issues such as flipped normals and make sure that it has a viable UV layout. A UV layout tells the software exactly how to apply a 2D texture map to a particular 3D object. UVs can consist of a single tile (texture) or be spread across multiple tiles if you want to dedicate more pixels to certain areas. You can also apply different shaders to your models to get a rough approximation of the desired surface qualities, such as plastic, rubber, metals and so on.

A beginner's guide to texturing

***Pilot* by Jaehyup Keum**
"To make this believable I tried to think about functions. Most of the helmet is made from glass fibre-reinforced plastic for a clear and wide view, apart from the mech sections"

ESSENTIAL TEXTURE MAPS

Colour maps

Of all the texture maps needed to be created, the colour map is usually tackled first – it's also the most common of the texture maps. "The colour map is required in around 99 per cent of the assets that texture painters work on," says van der Byl.

Essentially, this map defines the 3D object surface's main colour, containing information such as stains, scratches and dirt. It should generally be a flat map, clean of lighting information with no shadows or highlights, as that is what the other texture maps will inform. The colour map is also often derived from photographic sources. "Because of this, reference photos are generally shot with polarising filters to reduce highlights and under controlled lighting conditions," continues van der Byl. "In most cases, creating a colour map consists of grading reference photography taken from multiple angles, projecting those photos onto the geometry through 3D-matched cameras, cleaning up the result and making any fixes necessary.

"If the asset being worked on is not something that's a re-creation of a real life object, then the process is a little different and usually takes more time. For example, complex creatures can take around months of different revisions to really nail down the look of the textures, since you're not matching a direct reference."

As for the diffuse map, lead texture artist at Method Studios Ben Neall described it as the surface of an object. "It allows you to really wrap your head around what you are looking at, while the other maps are more abstract," he explains. "I recommend building up your Diffuse map with layers – you can then use those layers in different ways for your other maps."

Specular maps

Specular maps are also created in most instances to determine the specularity, or shininess, of an object. Usually, they are greyscale maps, where the greyscale values affect the surface property. "The darker the map, the duller the object will appear. The lighter the map, the shinier the object will appear," explains lead modelling and texturing TD at MPC, Paul Nelson. "For example, metal would have a lighter specular map, while a stone texture would require a darker specular map as it has a much dryer and less reflective appearance and surface quality compared to metal." A specular map can also add imperfections, scratches and shine to a metal armour or make human skin look real by adding glossiness to areas such as the tip of nose, forehead and cheeks.

"Without question, the most useful texture map type would be the specular map," says Holt. "A highly detailed colour map will look fantastic up close, but from a far to even mid-ground distance, the work is lost. Meanwhile, the Specular maps can still easily display whether a surface is shiny or not from the farthest distance. This is why this map is so important – I feel it gets neglected over the development of the displacement and colour maps. I firmly believe artists who spend more time on their specular maps ultimately yield better work."

Leigh van der Byl notes, however, that it is important to remember that specularity can actually be considered somewhat of a cheat. "It simply imitates what, in real life, is actually reflections of light on surfaces," she explains "But because reflectivity takes longer to render, Specularity is often used instead."

Tips for the texture artist:

Leigh van der Byl

The most important thing to start with is reference – never work without it. Even if you're working on something that doesn't exist in real life, plan your surface and find appropriate references. If your work is intended to be realistic, then using photos as a base for your textures is always going to produce a superior result to an entirely hand-painted texture. Unless you're extraordinarily skilled, it's best to always work with photos.

Dorothy Ballarini

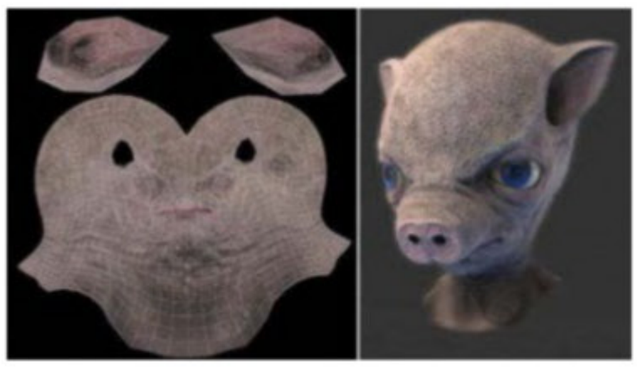
First of all, it's important to have a good eye for colour and attention to detail. Next, it's good to have technical knowledge relating to how your maps (colour, specular, displacement and so on) are going to behave on the surface of the object. It's also very important to have a basic understanding of digital photography since we use photographs to paint textures all the time. Knowing how to grade them properly to achieve the right kind of colour fidelity using a Macbeth chart is indispensable.

Last, some knowledge of any 3D application is very important, as you want to be able to see how your textures are going to look like under the influence of lights. You should also know MARI and Photoshop as you'll be using them to paint your various maps.

Texture tips
by Justin Marshall

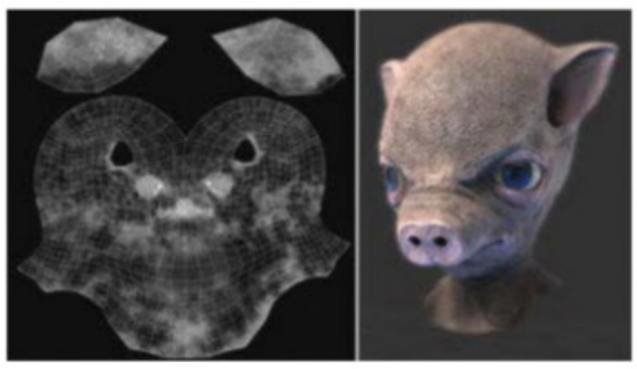
COLOUR MAPS

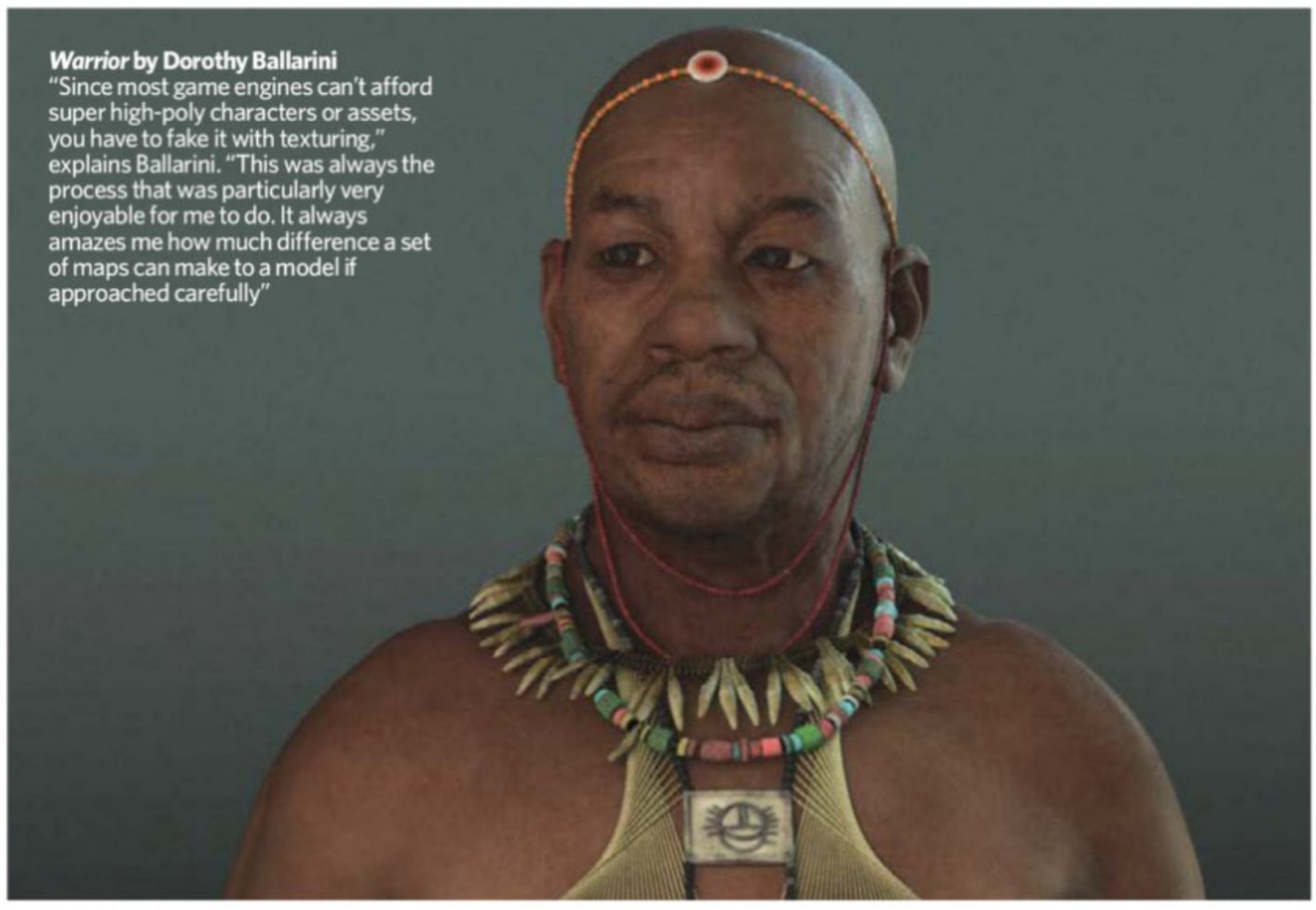
When you think of texture mapping, colour maps might be one of the first things that comes to mind. Colour maps can go a long way in defining surfaces as being made of different real-world materials. They can also sometimes be used as a basis for other types of textures, such as bump or specular maps. Colour maps can be painted in 2D applications like Photoshop or they can be painted directly onto a 3D object in programs like ZBrush, Mudbox or MARI. It is sometimes known as a Diffuse map.



SPECULAR MAPS

For a basic specular map, use dark tones to reduce specularity and light tones to create a stronger highlight. For metal surfaces, try painting with a colour that is similar to the surface colour. These maps can be created in Photoshop by painting them manually or by changing the levels or curves of a colour map. They can also be painted interactively in programs such as Mudbox or MARI.





***Warrior* by Dorothy Ballarini**
"Since most game engines can't afford super high-poly characters or assets, you have to fake it with texturing," explains Ballarini. "This was always the process that was particularly very enjoyable for me to do. It always amazes me how much difference a set of maps can make to a model if approached carefully"

A beginner's guide to texturing

Bump maps

The bump map is another greyscale map, in this instance used to store height information. It will create the illusion of an uneven surface when rendered, even though the geometry of the object doesn't actually change. Values that are above 50% grey on the map will appear to raise the surface and values that are darker than 50% grey will seem to indent it. However as no geometry is actually being moved, the Bump map will render quickly.

"Remember, a desaturated diffuse map is not a specular map, a gloss map or a bump map," reminds Neall. "It is just a desaturated diffuse map. There are even professionals that fall into this kind of laziness and it ultimately just makes your textures look worse." Even when a desaturated colour map does work well as a bump map, it will usually just be a lucky coincidence that every single light area on the colour map happened to work well as raised areas on the final surface, while dark values happened to be indented.

In most cases, though based on details of the colour map, the bump map requires custom work. "For bump, its fairly common to apply what's called a High Pass filter, which isolates the higher frequency details in an image," Neall explains. "This is a good starting point, but you should bring some of your diffuse layers in to modify the bump. For instance, the dirt layer would come in, and you would make that dirt a white colour for a raised effect and fade on-top appropriately."

Displacement maps

Although also based off a greyscale map, displacement maps work differently to bump maps by actually modifying the surface of an object, creating geometry and displacing it when it actually comes to render time. Ultimately, this will give the impression that there is more detail and depth to a model than there actually is.

Similar to bump maps, the whiter values represent geometry that raises up, with the darker values representing geometry that will dip down in height. "Displacement maps have become very widely used over the last five years or so and are becoming pretty standard now," says van der Byl. "Displacement works according to the same principle as bump maps, but unlike bump, displacement does actually change the geometry at render time, shifting it according to the values in the map. For this reason, displacement maps take longer to render, but produce a superior result, especially when you need details that are larger than small abrasions and scratches." It's also due to this same reason that Displacement maps are not commonly used in videogames, as adding more polygons is too memory intensive for most game engines to handle.

"It's best to create Displacement maps in a dedicated application such as ZBrush," van der Byl concludes. "It can output 16-bit and 32-bit maps, which are necessary to produce a really smooth displaced result."

SPECIALIST TECHNIQUES

Mask maps

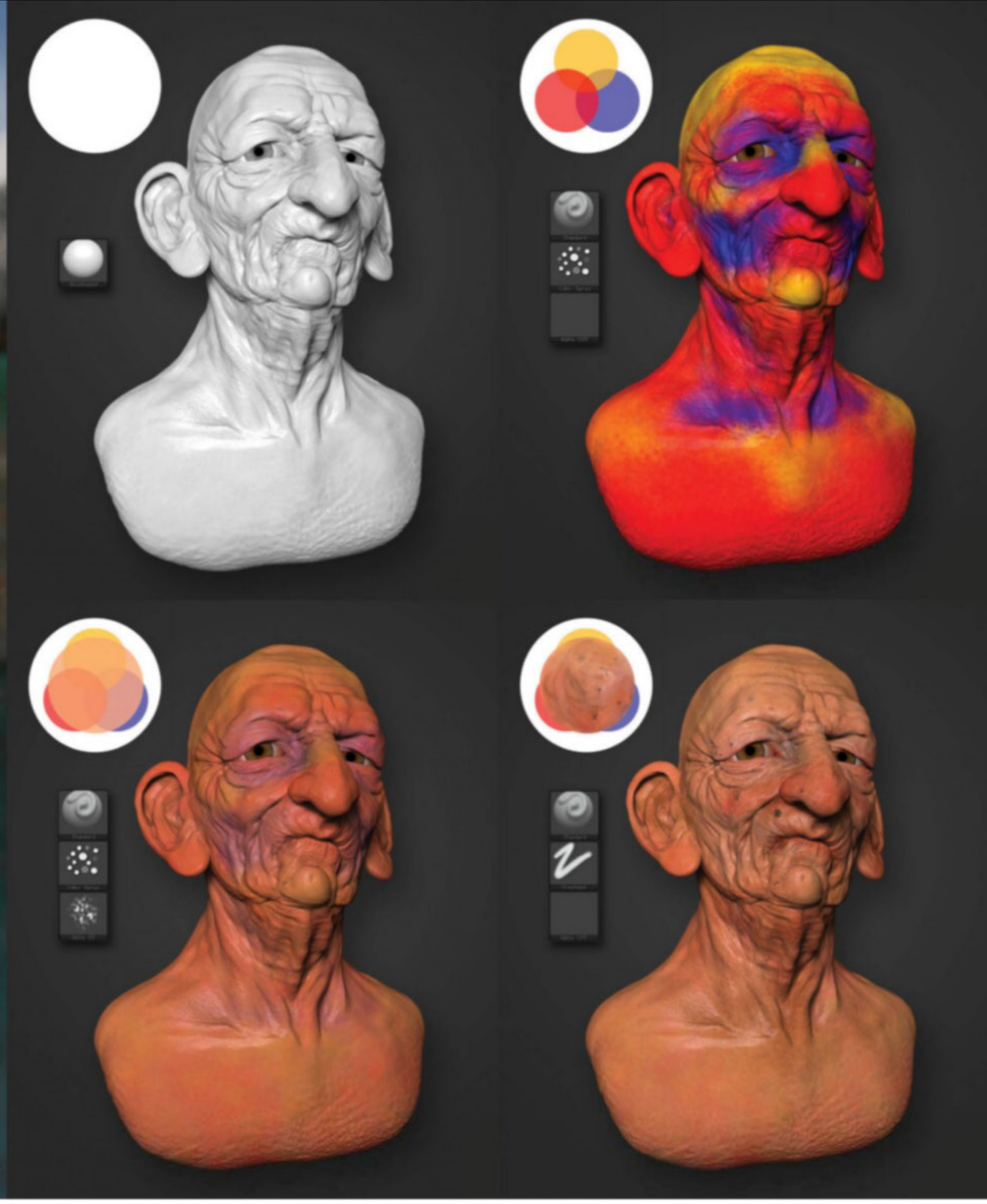
"What most people do not talk about is the sheer number of secondary maps typically needed for some hero feature film texture work," reveals Holt. "Gone are the days when you would supply a colour, displacement and specular map to the look-dev artist. Today, I paint anywhere from 30 to 50 secondary maps on top of those base maps to drive numerous surface qualities independent of each other. This allows for much more intricate and complex surface qualities, which a single map simply cannot provide." However, Holt says that in his experience, this is not the only part of the texturing process that tends to get overlooked. Another happens to be a category of maps known as masks.

"Masks are really just that, a mask or matte of a specific area on the model, so the shaders can isolate attributes to that area," describes Neall, explaining that mask-based painting is something that he uses for almost every project. "I love mask-based painting – it's a very non-destructive and flexible way of working."

Usually starting out as filled in black maps, which then are painted into with either stark white or soft gradients of grey, mask maps can be useful for everything from dictating exactly where wetness will appear on a character to painting photoreal-looking skin. "For example, if there is an asset that jumps in a large puddle or gets rained on, I will paint a set of Mask maps that are then given to the look-dev artist to drive this wet look only in the areas that I've painted white or any value above zero black," elaborates Holt. "For skin, I will paint a set of Mask maps that drive the amount of subsurface contribution on a pore level, which in turn will help eliminate the typical waxy, hollow skin look."

> "Hand-painting comes into play when tasked with creating something that does not exist"
>
> **Ben Neall**

***The Sailer* by Pablo Munoz Gomez**
"I started painting the model with an intense red, then used a saturated blue to define the hollow areas of the skull. I then added yellow where the bones are more prominent. On a second layer, I started painting with a realistic flesh colour with 70% Opacity to create translucency," says Gomez



Texture tips
by Justin Marshall

BUMP MAPS

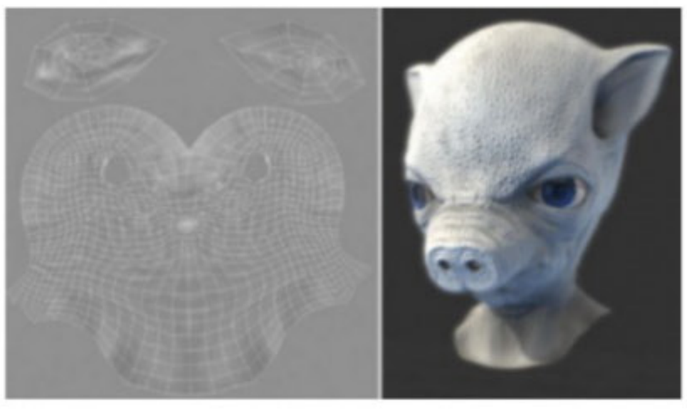
Think of bump maps as similar concept to displacement maps. In the case of bump maps, however, no geometry is actually being moved and a high number of polygons are not required at any point. Bump maps are typically greyscale height maps that create the illusion of raised or lowered details on a surface. Bump maps can be great for adding smaller details as opposed to large, more complex details. These maps can be created in painting applications like Photoshop, or interactively painted in programs like Mudbox or MARI.

DISPLACEMENT MAPS

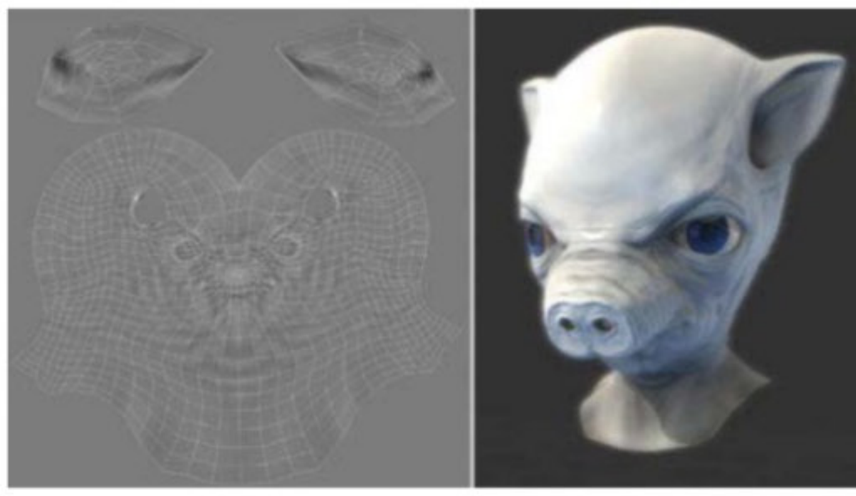
Displacement maps, often generated from high-resolution meshes, enable you to actually distort the geometry of the model itself. Simple greyscale maps can be used to define the height of the subdivided geometry, or you can use 32-bit maps or vector displacements to achieve larger, more complex details than with bump maps. Displacement maps can be created manually in a painting application such as Photoshop, or baked out from sculpting applications like Mudbox or ZBrush.

MASK MAPS

Sometimes it would be nice to combine multiple materials or textures together on a single object. With mask maps, you can use the black and white values of the map to define which texture layer is displayed on which area of the object. Depending on the application, white will define the areas for the texture to be visible, while black will display the other layers. This is a very flexible, non-destructive way to work because you can change where the textures appear without touching the maps themselves. You can use them to blend textures or create cut-outs for decals or tattoos. Mask maps can be very easily created natively in MARI and Mudbox, or created as black and white or greyscale maps in any kind of 2D painting application, including Photoshop.



Bump map



Displacement map

Mask map

A beginner's guide to texturing

HARD SURFACES: tiling textures ORGANIC SURFACES: projection painting

"There are essentially two types of assets we paint – hard surface and organic," says Holt. "For hard surface work, I rely heavily on custom-tiled textures in order to get me 80 per cent of the way there." With tiled textures, the texture map is simply a repetition of one small image – such as a photo of some grass or concrete – seamlessly tiled onto a large environment or asset. Along with texture baking – which is done by multiplying information such as the occlusion, reflection, and global illumination right on to the colour map – tiling textures is a technique known to be invaluable for saving memory within videogames.

What may surprise some, however, is that even for feature films, using photographs as textures as opposed to just hand-painting is crucial. "There's definitely an enduring belief among many beginners that using photographs for texturing is somehow cheating, which is a bit silly," reveals van der Byl. "You use whatever methods you can to get the best result, because all that really matters is that end result. Photos contain a level of detail that's so broad that you'd have to be an incredibly skilled painter to re-create the same thing from scratch without it looking hand-painted. Having said that, however, there's still some painting technique required when working with photos because with 3D models you're always going to be dealing with different sides of the object, which invariably means you're going to be blending together multiple photos to create any single texture. It's just more of an image manipulation process rather than a traditional painting one."

For texturing something like human skin, however, tiled textures cannot be relied upon due to the sheer intricacy and randomness of a skin surface. The work needs to be perfect. With skin being something we all see every day, all day, even an untrained eye will be able to subconsciously realise when something's not right. To tackle this, Holt will use projection painting – the act of painting through a photograph to apply detail directly onto an asset. "For organic texture-painting, such as with humanesque work that requires skin pore and wrinkle texturing, the process is 95 per cent projection painting from cleaned up photographs and surface mimic skin scans," he explains.

"Generally speaking, projecting photographs is important when you are reproducing something, such as an animal, person or building," concludes Neall. "However, hand-painting comes into play when you are tasked to create something that does not exist, such as an alien creature, space ship or other fantasy subjects. Ultimately I feel that successful texture artists are those who can marry the two, weighting whichever technique will result in the best result for their asset."

Other maps

Paul Nelson

Ambient Occlusion **Ambient occlusion attempts to mimic how light radiates in real life.** Internal surfaces will become darker with an evenly distributed shadow and external surfaces will be brighter. An occlusion bake can be generated in any 3D software these days. This can be useful as a base for creating Dirt maps and mixing with elements in NUKE.

Opacity **A black and white map that determines how transparent an object or surface is.** White is usually where objects appear solid and black defines where things would be transparent.

Dorothy Ballarini

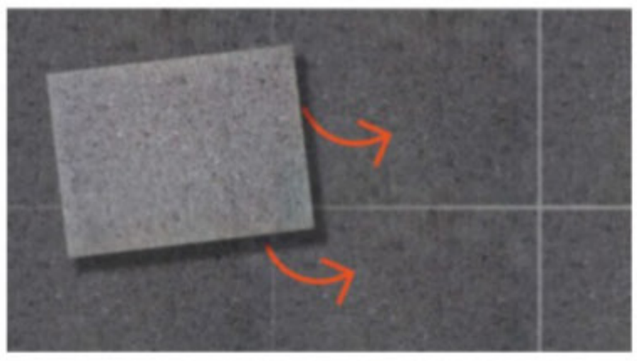
Reflection map **These define how much of the surface should reflect the environment and the intensity.** If the entire surface is reflective, there's no need for a Reflection map. They are greyscale maps, with black indicating no reflectivity and white indicating reflectivity.

Normal map **The Normal map is a more powerful version of the Bump map.** Instead of only height information, it has two extra multi-directional channels that indicate what direction the face is turned to. While the Normal map can give a more realistic look, it still doesn't actually alter the geometry of the object.

Texture tips
by Justin Marshall

TILING

When texturing large surfaces, it's often necessary to create an entire map from just one small section. For instance, if you are required to texture an entire parking lot, you may only have an image of a small portion of asphalt from your driveway. For that image to cover the whole parking lot, you would need to repeat, or tile, the image across the geometry. However, this can cause visible seams at the edges of every tile. Thankfully, many applications have tools that enable you to repeat the edge pixels to create a new image that tiles seamlessly across your surfaces.



PROJECTION

Photos can give you a lot of detail for free and don't necessarily have to correlate to the actual source. For instance, a stone surface can become the basis for an alien skin. In programs like MARI or Mudbox, your image lives on a virtual plane above the geometry. You can move, rotate or scale the image, as well as the underlying model. Once both are positioned correctly, you can paint through the image to apply the detail from your photograph onto your model.

> "There's definitely an enduring belief among many beginners that using photographs for texturing is somehow cheating, which is a bit silly"
>
> **Leigh van der Byl**

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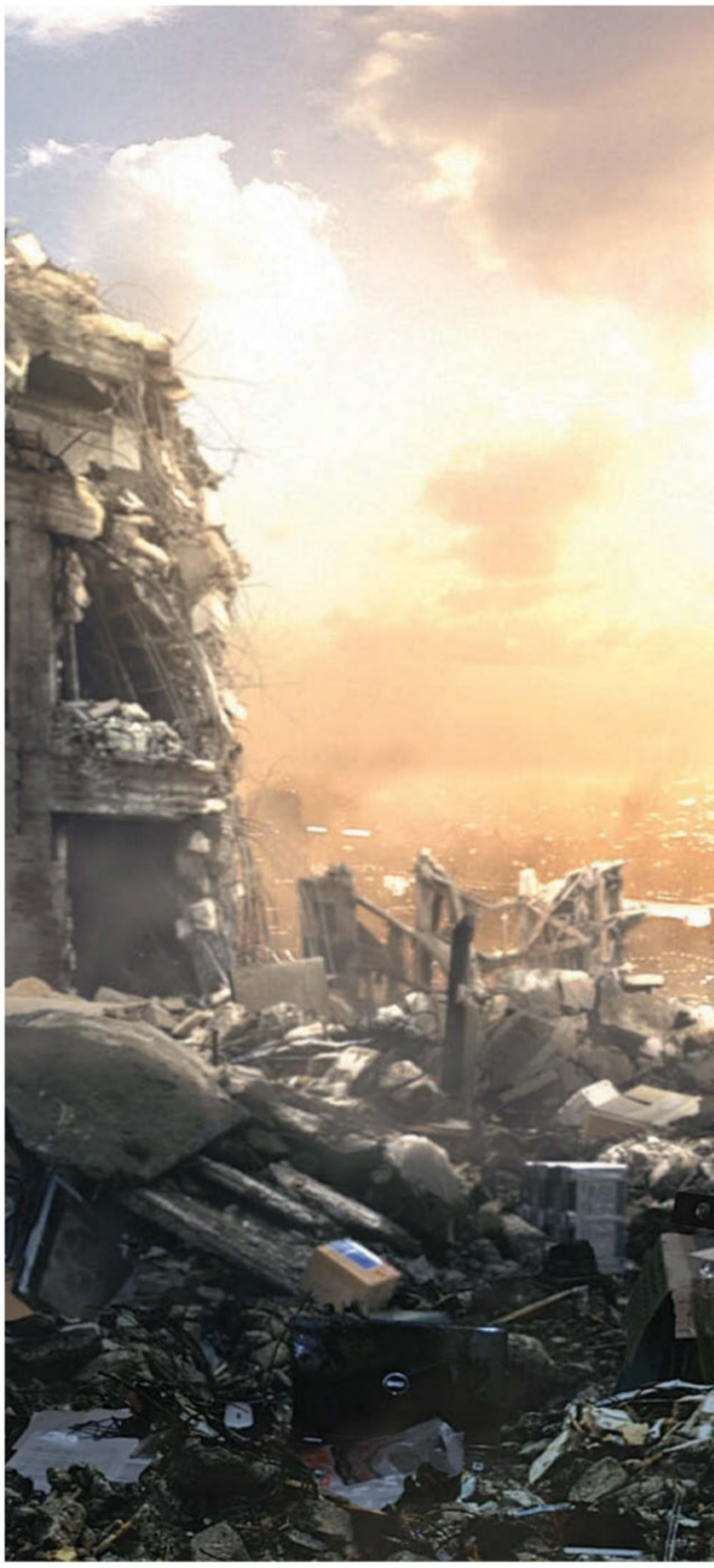
ONE YEAR ON

Five talented newcomers to major VFX facilities reveal how it really feels to start out in the industry today



When we consider the visual effects process, it's easy to immediately start thinking about its glamorous side – a creative maelstrom of explosions, robots and aliens, with flights to LA and meetings with top film studios. However, it takes a great deal of time to get to the stage of supervisor or creative head – you're going to need to complete many successful renders, deliver several groundbreaking projects and get decades of experience under your belt before you'll get a taste of the lifestyle.

So what is life really like in the visual effects industry when you're just starting out? To find the answer, we sat down with five talented junior artists who have recently began their careers at some of the biggest studios in the world. Read on to find out what day-to-day life is like for a new artist on the front lines, and what it takes to compete for a coveted position in the industry.

Everyone has come from different backgrounds, so there is a wealth of knowledge to tap into, and every day is a learning day. However, it's important to remember it's really hard work. It's challenging.

Laura Macfadyen

Bad Day At The Office
A matte paint by Laura Macfayden for an independent film by Nick Scott. The matte painting comprises everything except the small mound that the characters are posed on

One year on

RICARDO MUSCH

JOB TITLE Digital compositor
STUDIO One Of Us
LOCATION London
EDUCATION Escape Studios
KEY PROJECTS *Jupiter Ascending*, *The Numbers Station*, *The Monuments Men*

What led you to studying at Escape Studios?
I'm from The Netherlands originally and when I looked in 2006, there was only one school that did visual effects, but they took on very few students and it was kind of a general study. I went to an open day at Escape and there they actually taught us that you don't have to do everything. I eventually went to university in The Netherlands for one year doing game design, but I wanted to get into visual effects, not into games. So I stopped what I was doing and I said, 'I'm going to save up and I'm going to go to Escape Studios'.

With all the recent unrest within the visual effects industry, did you ever feel discouraged about getting into a visual effects career?
While I was at Escape, Digital Domain went bankrupt, Fuel Visual Effects in Australia went bankrupt and we were reading those things just before starting class every day. It was discouraging, but on the other hand, I do believe in the fact that these things can change. I would have never guessed that I would be working on a blockbuster film within a year after graduating from Escape, it was incredible.

What are the main things you've learned working at One Of Us professionally compared to when you were a student?
How everything has to be pixel perfect, so say whenever I remove a wire behind somebody with blonde hair, I really have to go in and push the black pixels away and leave the blonde pixels from the hair there. Even something like adding grain on the film is very important. Before, I always thought that a grainy film was a bad thing, but no, the grain is actually there because it makes the film look like film! If I make a tattoo for somebody's arm, the tattoo has to have the same grain as the film around it, otherwise it looks fake. How much else you do on that shot doesn't matter unless the grain is right.

While I was at Escape, Digital Domain went bankrupt, Fuel Visual Effects in Australia went bankrupt and we were reading those things just before starting class every day | **RICARDO MUSCH**

Are the hours needed to get the work done in the industry really as long as they say?
Right now we're in the last six weeks of *Jupiter Ascending* and we are working one day more, so six days a week – I don't think that's bad. If it had been like this from December until now, then there's something wrong with the studio doing the project. On Saturday we get lunch, you can come in at ten or eleven o'clock instead of nine, then you go home at five or six o'clock, it's actually quite nice! Normally on my Saturday I lie in bed until midday. Now I can work and make some extra money!

What are the best things about working in the industry as a newcomer?
Personally, the best thing would be seeing my name on the screen afterwards. There's a feeling of pride when sitting in the cinema and seeing your name. I also think it's a really cool industry. The people are really great and we're all different. Even other studios tend to be friendly – they are competitors, but also friends.

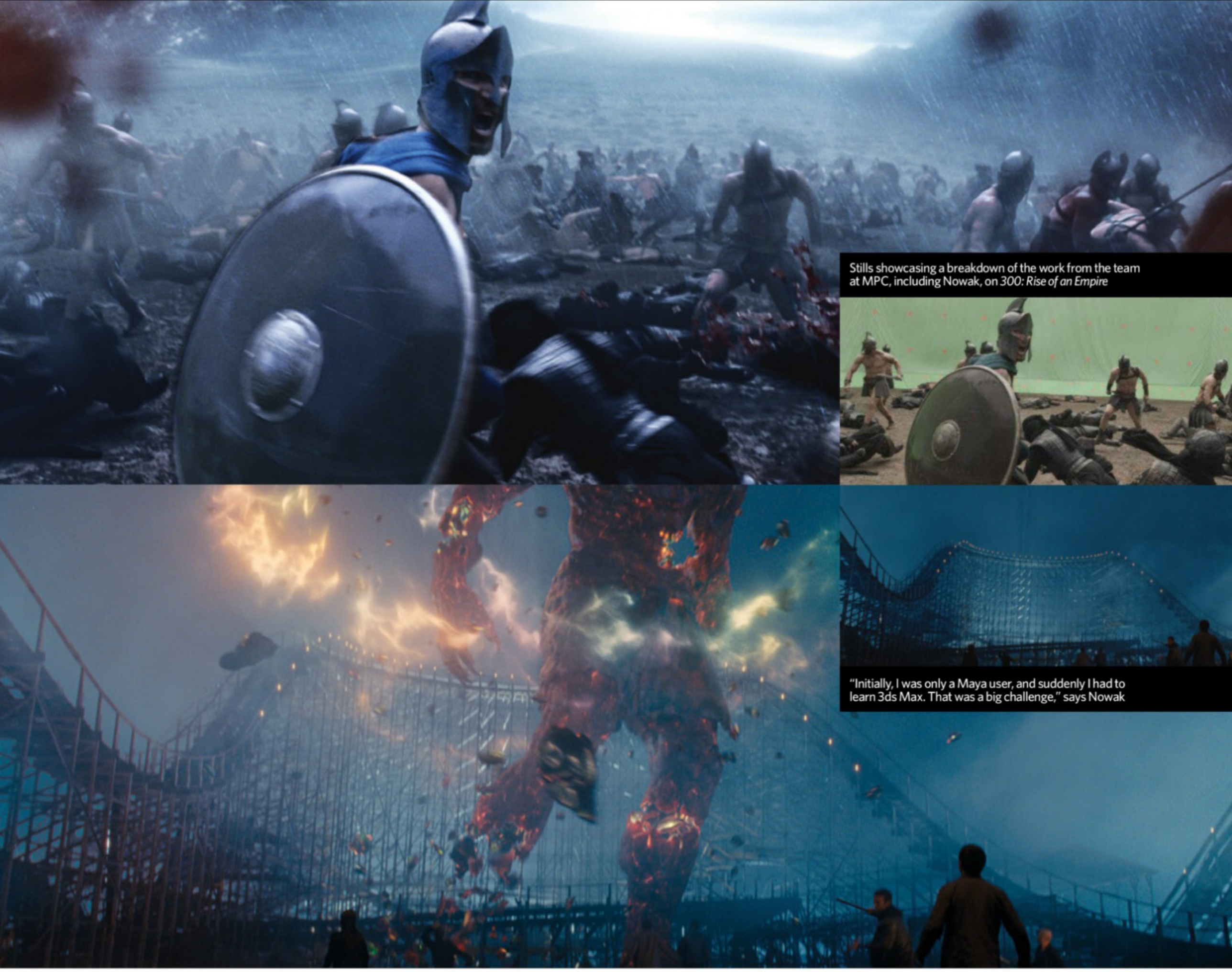
I'm still young, so the prospect of travelling and searching my way across the world and then settling in a place where there is visual effects work like London, Vancouver, Montreal, Los Angeles, Australia or Singapore – that is exciting! It's not work for me, it's my hobby.

TIPS FOR SUCCESS

"I would, of course, recommend Escape Studios to others, although don't go there with the mindset of working nine to five and being done," says Musch. "Afterwards, you stay. Especially in visual effects, you can't teach somebody by going over all the problems that can happen, because there are too many. You just have to do a project yourself and then when you find problems you can ask the teachers questions the next morning. At five o'clock you're already really tired from the class because it's a lot of information in one day, but eventually it will be worth it because you will be in the industry. Also, make sure that your reel is high quality. When I was a graduate from Escape and didn't have that many shots finished, and my reel was 30 seconds long, but I still got hired because they were good. Just do something simple, original and interesting to watch."

Ricardo Musch advises students to not to get too ambitious for their reel. It's best to focus on something unique that showcases your skills clearly.

Work from Sophie's Fortune, a short film Ricardo Musch has been helping on. In this breakdown image you can see the composited shot with matte painting and the original plate



Stills showcasing a breakdown of the work from the team at MPC, including Nowak, on *300: Rise of an Empire*

"Initially, I was only a Maya user, and suddenly I had to learn 3ds Max. That was a big challenge," says Nowak

Fabian Nowak

JOB TITLE FX technical director
STUDIO MPC
LOCATION London
EDUCATION Ecole George Méliès
KEY PROJECTS *Guardians Of The Galaxy, 300: Rise of an Empire, The Monuments Men*

What were the problems you faced and lessons you learned that helped get you where you are today?

When I finished at school, I was absolutely in love with compositing. I started out as a Flame assistant on commercials, short films and one feature-length film, *Transporter 3*.

After that, however, there was no job for me in Paris for compositing, but I didn't feel ready to leave my country at that time. So I changed my mind and accepted a job offer from Ubisoft to work as an FX artist in AAA video games. Funnily enough, this probably ended up being the best experience I had in my professional life.

I worked in a massive international team of around 300 people on a long, tough, big-budget project. I think that was a very good step and good training for my move to London to join MPC. I feel right at home at MPC. The people are so cool and friendly, the shows are awesome – I mean, I wanted to work on big titles and we only have those here!

Shifting from a Flame assistant to an FX artist must have been a big change in the first years of your career!

Yes, it was a big change, from working on 2K or 4K pictures in dark environments with just myself and the Flame artist, to working on AAA games in a huge open space with hundreds of people. It was definitely a very fun atmosphere!

Is there a big difference between working in games and films now?

I definitely had to learn a lot of new techniques to work on games. At Ubisoft I used to create cool effects with 20 or 50 particles with animated or fixed textures in very low resolution to avoid reaching the memory limits, but I was able to make a lot in one week. At MPC I'm using mayaParticles, nParticles, Fluids, and more, generating billions of particles, sometimes with the help of the renderFarm, so the time spent on one single effect is way longer and in 4K resolution quality.

Could you describe a typical day for you at MPC? What does an FX TD do every day?

I work with particles and fluids, so it's always quite fun if you love particles. Basically, I get a shot, and I need to do my particles/fluid simulation, then I need to light it and render it. I then make a simple comp to show the result to the supervisor in one of MPC's FCP suites. He then gives me some feedback and some notes that I will need to address for the next version.

Once the supervisor is happy with the effect that I have created, I will release the render passes to the compositing department, or the particles/fluids caches to the lighting department so that the project can progress.

The most challenging work that I have done so far is probably the effects work that I'm currently doing for *Guardians Of The Galaxy*. I'm using a very powerful in-house visual effects tool that I learnt while working on *300: Rise of Empire*.

One year on

Staying motivated

"It is a big challenge to stay motivated when looking for work in the industry as it's a difficult world to break into – I can't tell you the number of times I applied to places and was refused," reveals Laura Macfadyen. "To get into matte painting, do as many Photoshop exercises as possible to get yourself comfortable with the tools and use of creative brushes, even making your own brushes. Go online and find challenges, or use archived ones that you can do at your own pace without feeling the pressure of deadlines. Learn projection techniques, and build yourself a showreel and post it online. Remember, the more places you have your work, the more chances you have of being noticed."

Macfadyen advises to not only post work on a personal website or websites such as Vimeo, but also on LinkedIn, as there are always people looking for talented artists.

Darth Vader pulling London's BT Tower from the ground and turning it into a lightsaber. This was the main idea for Macfadyen's showreel following Escape Studios

Rebecca McKee

JOB TITLE 3D tracking and integration artist
STUDIO Method Studios
LOCATION Los Angeles
EDUCATION Savannah College of Art and Design
KEY PROJECTS GE 'Imagination at Work' spot launched during the opening ceremony of the 2014 Winter Olympics, Fox Sports 'Cleatus and Beats' promotional videos

Could you tell us more about yourself and how you first discovered visual effects?

I'm 23, originally from Eaton, PA and a Savannah College of Art and Design alumni. When I was about ten, my big brother got a video camera for Christmas and I practically stole it and filmed pretty much everything.

I wanted to make movies, but soon I found that I couldn't film what I wanted to create. Before I knew it, I was playing on the computer for hours a day with Photoshop, After Effects, and LightWave. I had no idea that I was doing VFX at the time, or anything about the industry.

How did it feel to get hired at a studio as big as Method Studios?

Method Studios comes every year to SCAD's career fair and I always visited their booth. My senior year I had a serious conversation about potential entry level job opportunities at Method. Soon, phone interviews followed and next thing I knew I was on my way to LA. I was thrilled by the opportunity and surprised when they remembered my reel and how I grew as an artist.

In your opinion, is there a best education route to go for when aiming to get into VFX?

No, I think everyone learns differently. Some do better self-taught, while others thrive in a classroom. I work with people who are fresh out of college like myself and studied visual effects – some who are probably older than the industry itself and others who studied something different altogether. How we gained our knowledge is different, but what we all have in common is our passion for visual effects and our energy to never stop learning.

How has it felt to work as a professional in the visual effects industry so far?

Method has been awesome. I couldn't have asked for a better group of people to welcome me into the visual effects industry. From my first week, co-workers were taking the time to say hello and welcoming me to LA and Method. Artists were going out of their way to show me how they did lighting on a shot, polished some textures, or bringing me out to set. When I entered the camera and logistic department I expected it to be a job and nothing more – I couldn't have been more wrong.

What advice would you give to others looking for the same experience?

I would tell them to take the entry-level job. Of course, everyone wants to land their dream job they studied hard for in school or spent hours on the computer learning about, but everyone has to pay their dues. It might be surprising what you can learn in the meantime. A job as a runner or in a camera department exposes you to all aspects of a VFX studio and surrounds you with people to learn from. I'd advise them to do and learn what they love, yet keep an open mind. I used to say 'I'm not a modeller', or 'I'm not an animator', when I could be.

A project with fantastical plants created by Rebecca McKee. The Metaballs were simulated in Houdini and the project was completed in Maya, mental ray and Photoshop

Laura Macfadyen

JOB TITLE Digital matte painter
STUDIO Framestore
LOCATION London
EDUCATION Bournemouth University, Escape Studios
KEY PROJECTS *Dracula Untold, Guardians Of The Galaxy, Jupiter Ascending, Winter's Tale*

Were you always interested in becoming a digital matte painter within visual effects?

After school I didn't know whether I should go to college or university, or find an internship or a job, because I had no idea of what career I wanted. I visited my local college and picked up their prospectus. All I knew is that I wanted to do something creative and for some reason had carpentry in mind. I began to flick through the pages of the C index, where I saw computer modelling and animation at Bournemouth University. I loved *Finding Nemo*, so on impulse I decided to go to the interview for the course and was accepted.

Was getting that first professional job after graduation a challenge?

I couldn't find a job initially after graduating and worked in a call centre for around six months. I was applying everywhere and anywhere to find a 3D modelling position and failing at every attempt. I felt I needed to increase my skill set to make me a more appealing candidate. I finally worked for a couple of small companies as a 3D modeller/texture artist and realised very quickly that I really enjoyed working in the 2D side. I then worked for a few years as a retoucher and built up a matte painting portfolio in my spare time.

Is the experience of working as a matte painter at Framestore what you were expecting it to be?

Framestore has a great energy about it and it's a privilege to feel a part of an amazing workforce in the creation of film VFX. The matte painting department has a lot of fun together and it's a joy to work alongside the people in it. Everyone is happy to wander around from time to time to see what each other is doing, and since everyone has come from different backgrounds there is a wealth of knowledge to tap into, so every day is a learning day. Conversely, it's important to remember it's really hard work, with a lot of hours spent in front of the computer. It's demanding and challenging.

What advice would you give to students or anyone hoping break into the industry to work as a digital matte painter today?

The route that my professional life took happened to work out, but this may not have been the case. In order to make the process into VFX more direct and assured, I would like to have known about graduate entry-level work in roto and prep. A lot of people get a junior career doing this and work a couple of years before moving into the role they want. There are people in my team now who got their foot in the door this way.

Digital matte painting from TV film *The Thirteenth Tale* at Framestore. "My head of department recommended a good book, which I'd recommend, called *Color and Light* by James Gurney," she advises. "To be able to tie a landscape together you need to know how light influences pretty much everything"

TOP Shot from GE 'Imagination at Work', a VFX-heavy spot turned around in two weeks by the artists at Method Studios

LEFT Shot from Fox Sports 'Cleatus and Beats', which McKee worked on at Method. The studio was tasked with replacing the performances of a live actor with a believable, fully CG robot

MIDDLE CG components from the GE ad included aeroplanes with bird wings

One year on

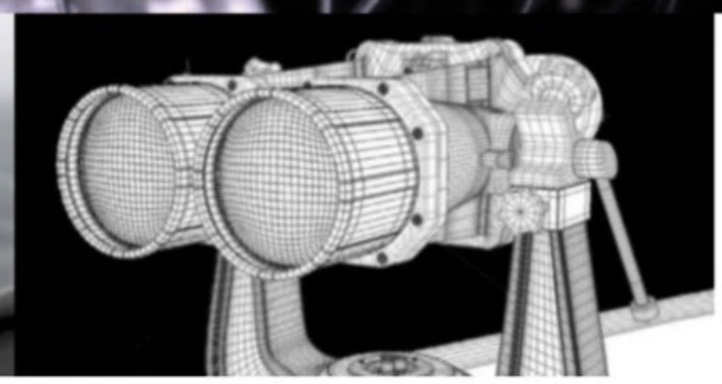
John Gresko

JOB TITLE Matchmove artist
STUDIO Double Negative
LOCATION London
EDUCATION BA Hons, 3D Multi-Disciplinary Design (BUCKS) and VFX Production Course, Escape Studios
KEY PROJECTS *Interstellar*

TOP Chrome spine by John Gresko. After working in architecture, Gresko began pursuing a VFX career, living in a hotel and working at B&Q in order to afford his dream course

RIGHT Work by John Gresko. He is now a matchmove artist working on Christopher Nolan's *Interstellar* at Double Negative. "I would say the main success that lead to me working in the industry was choosing to study at Escape Studios," he says

BOTTOM Binoculars by John Gresko. "After I got over the initial trauma of watching *Aliens* when I was seven years old, I have been a huge fan of science fiction films and the effects in particular," he explains



How did you first become interested in a career within the visual effects industry?

After working in architecture for several years I came to realise that it wasn't what I wanted to do with my life. Having never acted upon it, I decided to take the risk and pursue a career in visual effects. While researching how to get started, I found Escape's website and one particular course they offered included everything that interested me most in terms of content. At the time I couldn't afford it and my credit rating was terrible. Luckily, I was offered a concept design position at B&Q that enabled me to clear my debt and live in a hotel for an entire year, very much like Alan Partridge. I was then approved for a career development loan and signed up for what is now called the 3D for VFX course at Escape Studios in London. Afterwards, on hearing that Double Negative was looking for camera trackers, I applied and started to work there as a matchmove artist.

I found the main challenge throughout this process to be the amount of competition out there. There are a large number of very skilled artists all competing for the same positions, many of which have far more experience. Initially I found this daunting, but with enough time, hard work and quality training, anything is possible. If I can do it, so can anybody else.

Could you describe a typical day for you as a matchmove artist at Double Negative?

A typical day as a matchmover at Double Negative is great fun. I spend the day tracking a particular shot with friendly assistance on hand should it be required. Double Negative doesn't departmentalise, so I am lucky enough to be surrounded by artists from various parts of the pipeline and am privy to lots of exciting conversations on how certain solutions, looks and effects can be achieved. The hours are long, but the result is worth it.

My experience so far in the industry has been better than I ever hoped it would be. Both the staff at Double Negative and the film I'm currently working on have made the risk I took two years ago completely worth it and I consider myself very lucky to be where I am today.

What skills and software do you feel would be best for beginners or students looking to learn more about visual effects?

Speaking as a 3D generalist, the skills that you will need to get into the industry include modelling, texturing and lighting, as well as rigging, particle effects, tracking and basic compositing. The best programs that I would recommend to learn are Houdini, Maya, Mudbox, ZBrush, 3DEqualizer, NUKE and Photoshop. If you get all of these programs mastered, you will be able to have all sorts of fun! In my experience, Houdini is perhaps the most sought-after by the industry these days in terms of effects, though it really is a good idea to have some working knowledge of the other software I mentioned. If you are dedicated and have a real passion for visual effects then go for it. Once you are there, it's great!

After working in architecture for several years I came to realise that it wasn't what I wanted to do with my life. Having never acted upon it, I decided to take the risk and pursue a career in VFX | **John Gresko**

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PREVISUALISATION
SETTING THE SCENE

Previs masters The Third Floor speak to Paul Hellard, revealing just how the ever-evolving craft is shaping the future of the industry

Duncan Burbidge
Studio manager
The Third Floor, London

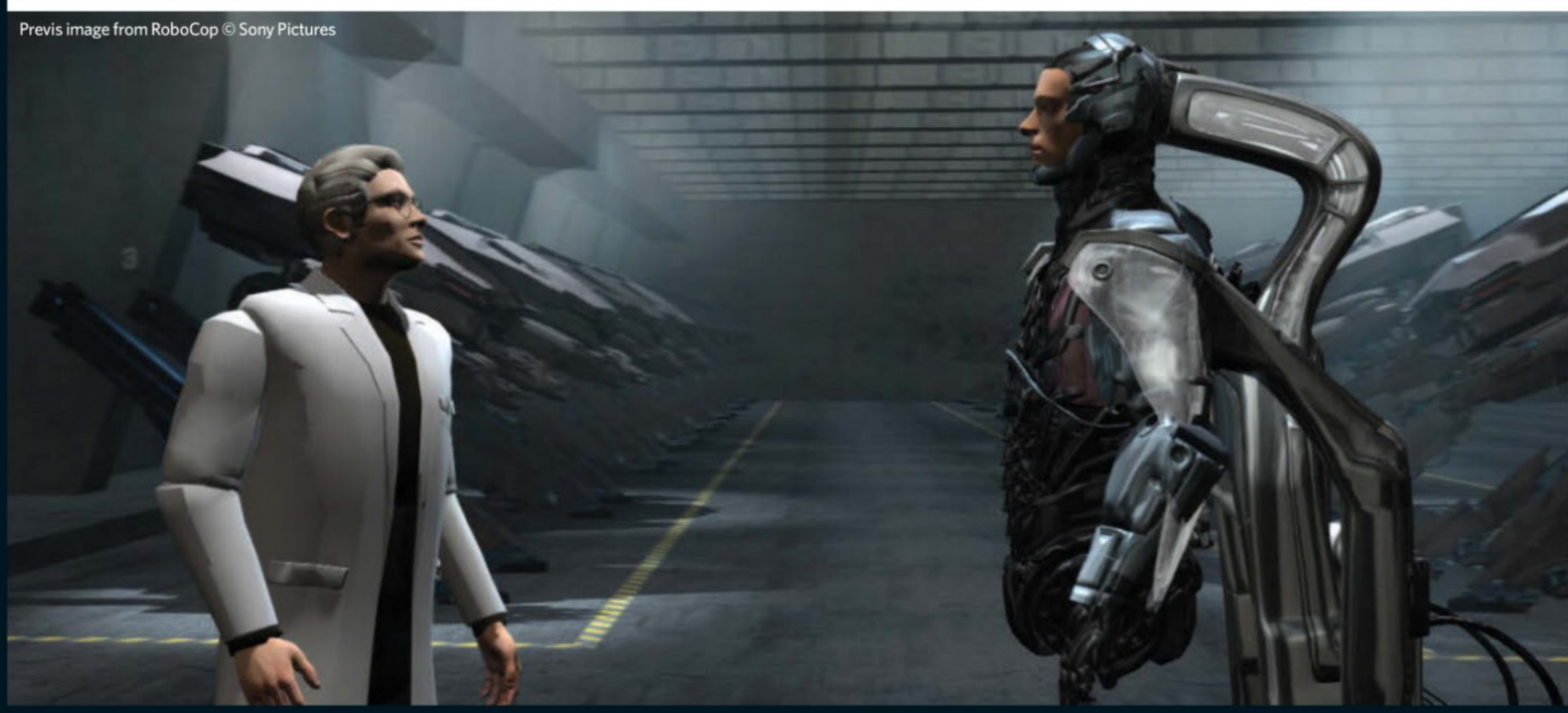
Patrick Smith
Previs supervisor
The Third Floor, Los Angeles

Over the years, previsualisation has become an incredibly important part of realising creative productions. Simply put, previs refers to the act of visualising the shots required for a project before they are filmed or created in post-production. This enables a production's various departments to be fully briefed before embarking on actual shooting or postproduction work.

Early film-makers used to rely on physical, scaled models to plan the camera angles and to guide the look of their films, so it's fair to say that previs has come a long way since then. Modern previs crews, with the help of today's software and computing power, are able to visualise entire layouts on screen, representing the director's vision with digital models, animation, performance capture, virtual cameras, environments and effects. This has been immensely helpful in TV production, game cinematics design, and movie storytelling. The process has revolutionised production by ensuring efficiency right from the point of raising funds for projects in development, through to the shoot date and now into the composite stages before release.

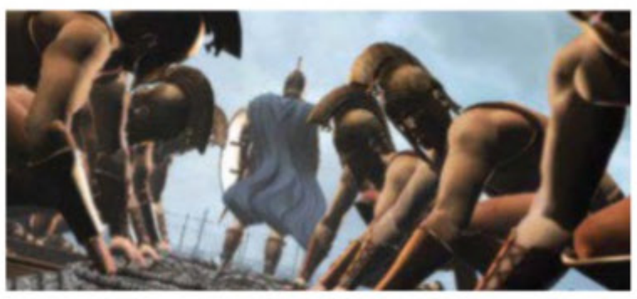
Eminent previs studio The Third Floor, whose credits include *The Amazing Spider-Man 2*, *Godzilla* and Disney's *Maleficent*, as well as films like Marvel's *The Avengers*, Marvel's *Iron Man 3* and Sony's *RoboCop*, are rather in the know when it comes to the process. When Duncan Burbidge, studio manager at The Third Floor's London office, started in the industry, the craft was focused around general planning and problem-solving. "We were working with very complex scenes, using previs techniques to flesh out what the director was trying to achieve and to see how that was technically possible," he explains. "Now, previs has become key across the whole filmmaking process, enabling complete creative exploration of ideas as well as the most efficient ways to execute them."

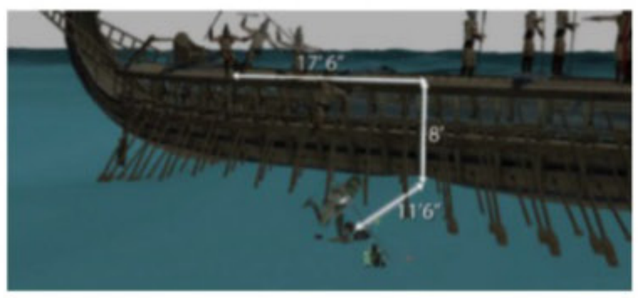
Previs can also be useful for communicating the concept of a project. "When reading a script, everyone imagines a different interpretation of the visuals, but previs can help focus everyone," Burbidge says. "In an ideal sense, the previs should be liberating for the director as they're not having to explain those visuals to everyone – they can show them. In doing so, each head of department can then have specific conversations about what's required of their department for that given scene."

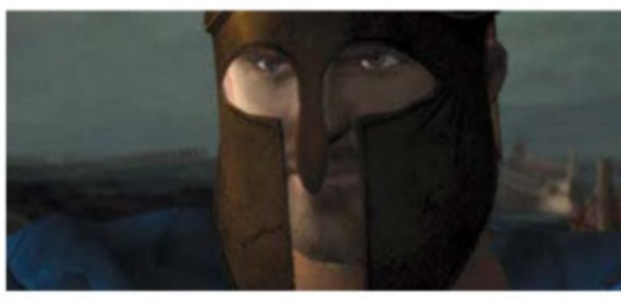


Previs image from RoboCop © Sony Pictures

Previs from Marvel's The Avengers © Marvel Studios







Previs from Marvel's Iron Man 3 © Marvel Studios

Previsualisation: setting the scene

SHOW AND TELL

Companies like The Third Floor, which has offices in Los Angeles, London, Montreal and Sydney, are now getting involved with the production of movies at a much earlier stage than before, sometimes starting at the aptly-named pitchvis stage.

"A writer and director might come along and say they have a great idea for a movie, but want to put together a piece of moving, breathing previs so they can convey to a studio or their financiers how great it could be," Burbidge says. "We are frequently asked to create short, trailer-length previs sequences to help sell a film. The reception for them has been fantastic and a lot of the films have gotten the green light. Pitchvis has almost become the normal thing to do at the studio level as a companion to the script. If it's something new or a different approach, the script often isn't enough to completely convey those ideas."

The previs team will usually consist of a supervisor and a small group of artists sitting with the director, working from concepts, storyboards and sometimes brainstorming visual sequences that aren't yet in the script. In these moments, a rapid iteration of ideas and suggestions can happen that influences the look and feel of the film. The Third Floor itself is working more and more on early previs for shows, even visualising sequences that don't have any VFX requirements.

However, the ideas presented in previs are also grounded in reality – sequences must be manageable through real-world shooting or visual effects. "You don't want to previsualise something really awesome that the director loves, but then the camera operator says that they can't run backwards at 200 miles an hour, or that lens simply doesn't exist, or that the film-back settings we're shooting on won't allow for that size of shot," Burbidge quips. "Our team really needs to understand the technical detail of modern digital film grammar as well as theory and composition."

Under guidance of the previs supervisor, the team will also try to match the cinematic style that a particular director might use in a movie, from choice of cranes, wides or close-ups, right down to lighting scenarios. "There's no point putting a shot in front of a director if you know their particular cinematic instincts wouldn't shoot it that way," says Burbidge. As such, being able to change a shot's look on the fly and present different iterations quickly is essential to creating the most useful previs.

Patrick Smith, a previs supervisor at The Third Floor's Los Angeles office, says another challenge is supporting clients as they explore the most creative ways to tell their story visually. "This can include collaborating to flesh out gaps with action choreography, help define the mood of a sequence and even sharpen character development," he says. "Clients often come in with a general idea or tone they are striving for and that gets honed into a concrete form through previs. Considering that a lot of the ideas are constantly evolving during pre-production, another must for us is to remain extremely flexible and to turn around new visualisations as quickly as new ideas come up."

Burbidge says this work can result in final shots that closely match the previs. "Sometimes the final shots themselves might be different, but the story beats are the same," he says. "And sometimes sequences take a totally different course, but the previs still played a role by allowing a lot of variations to be evaluated without the clock ticking."

All images from *The Amazing Spider-Man 2* © Sony Pictures

THE ART OF TECHVIS

When previs is developed with specific technical parameters for shooting, it is known as technical previsualisation, or techvis for short. Smith, who headed up The Third Floor's teams on *300: Rise of an Empire* and *The Amazing Spider-Man 2*, says that the key to a good technical previs always starts with the artist creating the shot.

In order to deliver the best end result, the artist first has to have a general working idea of how the production is going to create the shot in the real world. "The job includes a wide range of skills," he explains, "from understanding the limitations of the camera and rigs the filmmakers will be shooting with, to the layout and parameters of the shooting stage, even to knowing which lens package they will be using to film. If the artist has set up their scene file properly from the start, they will very easily be able to produce a great techvis shot."

Typically, techvis is created as top-down and/or side-orthographic views. In contrast to creative previs, techvis is about incorporating or determining specific calculations for the shoot. In addition to the film plate and lens data, this can include the distance from subject matter to lens, the distance the camera travels over time, the distance from subject and camera to green screens, the sizes of green screens based on field of view, angles of pans and tilts, the speed of camera over the length of a shot, and so on. Put simply, your understanding of film can't stop at camera angles and perspective.

"Just imagine you are given the final film version of a shot in a sequence and you are tasked with practically re-creating the imagery. With techvis, the goal is to map out as many of those parameters as possible for the production – but of course, before the shoot," Smith explains.

Whether creatively or technically driven, previs offers the benefit of everyone seeing a representation of final shots before they are created. Directors can show exactly what they want and producers can gain a better understanding of the costs involved. Cinematographers and VFX supervisors also get an idea of the challenges they will face so they can drive their research in the right direction. That way, everyone has much more preparation time to decide how they will get the story on the screen in the most effective way.

TOP Previs assets, such as a digital characters, are often composited into live plate photography to check alignment of elements and provide a working version of the shot for editorial and VFX

BOTTOM Previs is widely used as a language to express the director's intentions for scenes

Spider-Man fights Electro in a shot previsualised by The Third Floor, Inc. for *The Amazing Spider-Man 2*

1. The previs team references director-approved storyboards from the power plant sequence. The idea in this shot, not based on a specific storyboard frame, was to give Spider-Man an exciting melee attack against Electro during their battle in the power plant.

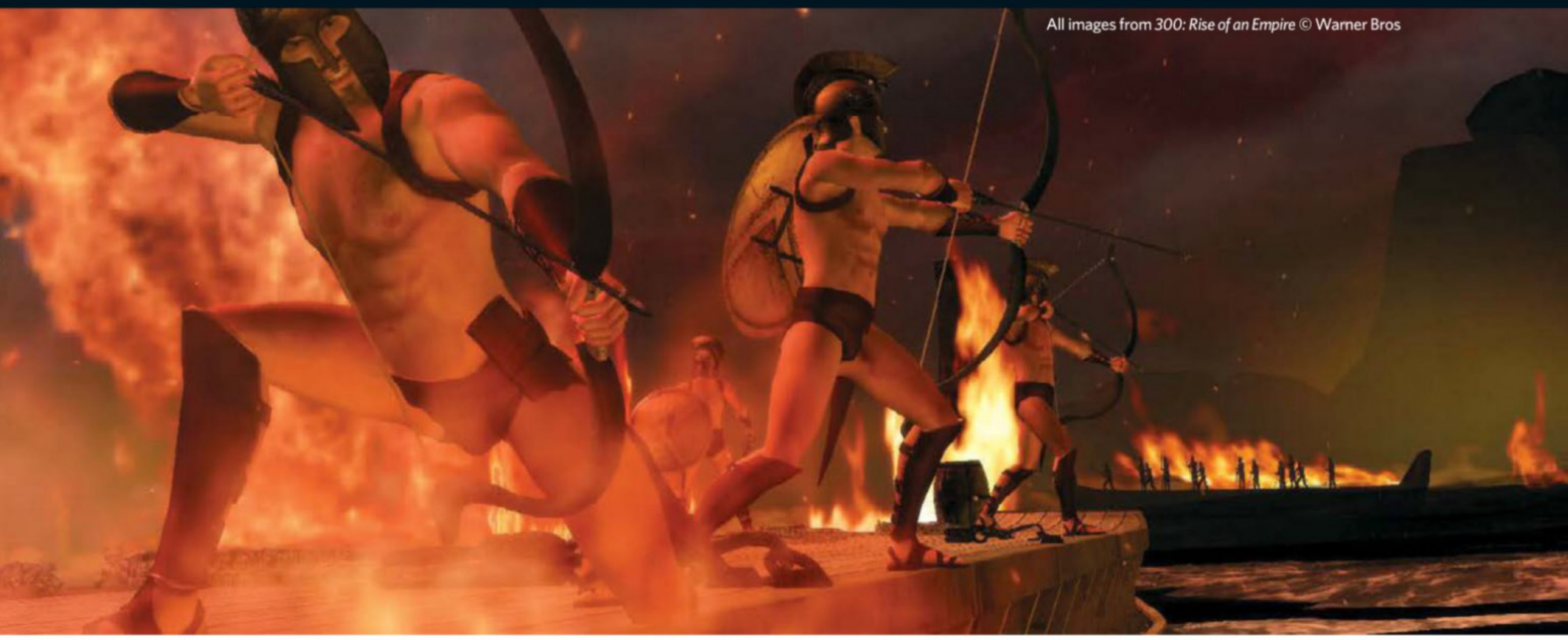
2. To create something with impact, previs artists model and animate Spider-Man, slinging a sizable piece of exploding pylon back towards the attacking Electro. The action is incorporated into the power plant environment and enhanced with particle, lighting and other effects.

3. To help the fast-moving action read better on screen a speed ramp is added, putting everything into slow-motion.

4. The entire shot is rendered at a tenth speed. Portions intended to be in real time are compressed back to normal speed to let the viewer savour the detailed and calculated movements of Spider-Man's superpowered agility, speed and wits.

5. Finished previs is rendered, reviewed by the director and delivered for use in the previs sequence edit.

Previsualisation: setting the scene



All images from *300: Rise of an Empire* © Warner Bros

TOOLS OF THE TRADE

"You absolutely must be a solid generalist to be a great previs artist," says Smith. "Since the previs process involves creating a full digital blueprint for the film, we need artists that are going to be versed in all manners of film production: storytelling, animation, composition, lighting, VFX, asset creation and so on."

The Third Floor works with small crews of artists, so while everyone is a strong shot creator, each person might also be specialised in more specific areas "This helps balance any requests that may come up," adds Smith. "As a small crew working in a previs/post-vis pipeline, our artists tend to wear many hats."

Most of the previs at The Third Floor is created using off-the-shelf software such as Maya, Motion Builder and After Effects, as well as custom tools and asset systems. "We've created a few of our own tools that are able to bolt onto those other packages. These enable us to get QuickTimes out of After Effects more quickly than we normally would, for example," says Burbidge. "Our final previs delivery used to be QuickTime movies, but these days we're being asked to deliver actual scene files from Maya as well. With the right protocols, things like composition, timing, scale and distances from our files can carry over beyond previs, but there's a lot of refinement, adjustment and interpretation that goes into the final VFX."

Virtual Rapid Prototyping (VRP) and Viewport 2.0 in Maya are some other specific innovations right now in previs. With VRP, a master scene file can be created of the blocked-out action in a shot. The director then can walk through the scene files while all of the action plays out, using a virtual camera to frame new angles and make notes of new ways to showcase the action. This essentially provides a realistic idea of what could be captured on set and gives directors a more hands-on approach to developing their ideas.

"Maya's new rollout of Viewport 2.0 has enabled previs artists to take the look of their work to a whole new level," says Smith. "Artists can render real-time shadows, ambient occlusions, realistic texturing and more interactive lighting than ever before. Getting your previs closer to the look of the final render makes it easier for the client to concentrate on story and other important aspects of the project, rather than the look of the previs."

VISUALISING THE FUTURE

The development of previs, along with techniques for virtual production, continues to help shape today's pre-production, production and post-production. Projects like Alfonso Cuarón's *Gravity*, previsualised in its entirety at Framestore, set a new bar for planning and realising ambitious cinematic concepts. Previs studios are regularly called on to previsualise large percentages of the total running time of a film and visualisation often continues across the project, whether pitchvis at the beginning or post-vis towards the end.

"These days, so much is being advanced in the way projects are realised. Films can even be test-screened at the previs stage, before production has begun," Burbidge points out. "Previs teams are often among the first on a show and we find ourselves in a unique position of carrying the director's vision from pitchvis through to previs and even into post-vis work quite close to the end of post-production. It's a fascinating paradigm and a really rewarding part of the job."

The techvis process

1. The techvis process enables filmmakers to plan out shots before ever stepping foot on set. Firstly, artists create previs for the shot, taking into account detail about production shooting and camera framing

2. In collaboration with Scanline FX, ocean simulations are integrated into the previs for added realism. Previs artists then incorporate elements to further reflect the lighting and mood of the scene.

3. A side-view techvis schematic is built to map out the position of the boat, the position of the shooting camera and the amount of camera pan. Results of this set up and any tweaks to it can be viewed with the previs witness camera

4. The techvis diagram can then be further evolved and referenced for the physical production on set, making for a much smoother process.

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Artist info

Yujong Wang

3DArtistonline

Username: jon84597

Website
http://drawcrowd.com/jon84597

Country Taiwan

Software used
ZBrush

Orc 2014

Creating this orc was the result of me simply wanting to practice my ZBrush skills. I aimed to create an orc head and add facial expressions to it, to give it both character and spirit.

> I fine-tuned the facial expressions, adding some naturally asymmetrical features. I think that this makes the final head much better!

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Maya Photoshop

Step by step

Easy-to-follow guides take you from concept to the final render

Artistinfo

Aldo Vicente

Personal portfolio site AldoVicenteCG.Wordpress.com
Country USA
Software used Maya, Photoshop
Expertise A CG generalist with a speciality in both materials and lighting

Add convincing reflections

Caballero Royal 2014

"Add details such as reflections and metal types to your work"

Aldo Vicente works as a freelance 3D artist, specialising in marketing, advertising and 3D visualisations in the medical tech industry

In this tutorial we will cover how to create convincing reflections in Maya, using the mental ray architectural material. The way we visually distinguish one material from another is by observing the way each material reflects and transmits light. To simulate a particular material type in 3D, we need to first learn to analyse how that particular material manages light in reality, then understand how to accurately convey that information to our 3D software so that it can calculate those reactions realistically.

The mia_material_x is an excellent tool for creating realistic materials because it is designed to manage light in a physically realistic way, while giving us total control to convincingly re-create virtually any material type. We'll quickly review some of the key behaviours of materials and light and how each behaviour is simulated in the shader. We will then move on to building our key materials for this scene, using an HDRI to quickly provide us with realistic reflections. After that, we'll discuss how to add imperfection to increase the realism of our reflections using Layered Textures and reflection maps.

Our end goal is to learn how to observe and understand reflections and re-create virtually any material type quickly and effectively!

Light and CG shaders

Review light behaviour and CG shaders

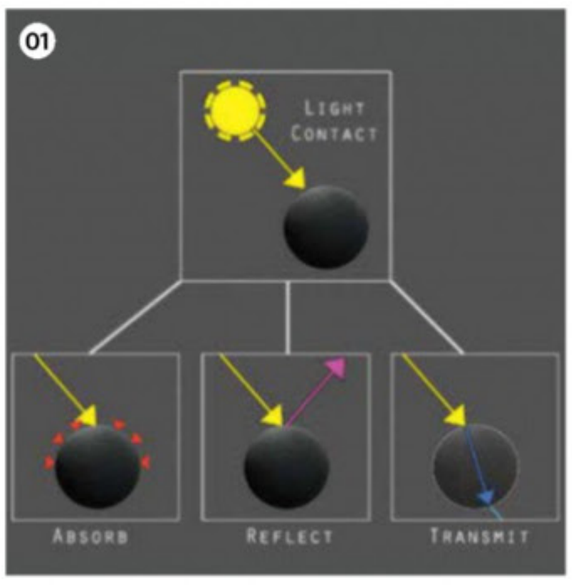
01 Absorption, reflection and transmission Light travels in waves and different light wave frequencies are perceived by the eye as different colours. When multiple frequencies are present we see the combination of their colours, and when all frequencies are present we see white light. When light first hits an object, the light waves will be dispersed in one of three ways, depending on the material. Some frequencies are absorbed into the object, some are reflected off of it and some may be transmitted through the object.

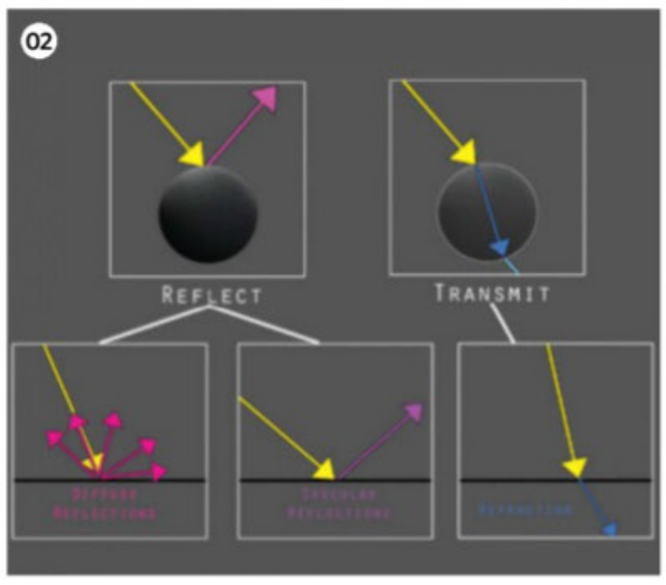
02 Shader components Absorbed light is converted into heat, so it's never seen by the eye and we don't need to control it. Light that isn't absorbed can be reflected off the materials surface, either as Diffuse or Specular reflections. These do reach the eye and are important in our shader. If the material has transparency, light waves of certain frequencies will be transmitted through the material, refracted and re-emitted on the opposite side. So, the three components of our shader are Diffuse and Specular reflections and refractions.

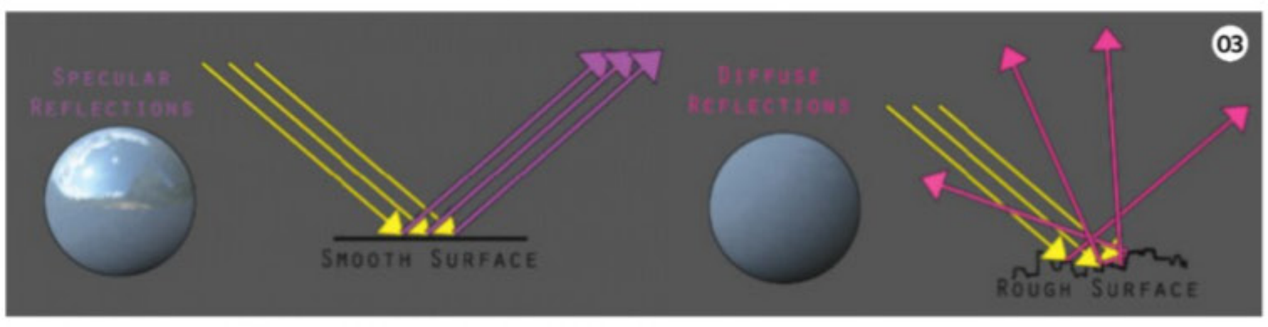
03 Specular versus Diffuse reflections We see Specular reflections when light hits a microscopically smooth surface and it is reflected directly into the viewers' eye. This kind of surface means that light can bounce cleanly and intact off a material. This is why Specular reflections can form an image. Diffuse reflections are seen when light hits a microscopically rough surface. This roughness means that light is broken up and bounced around in many different directions, often bouncing more than once, losing more of the original frequencies with each bounce. This is why Diffuse reflections are closer to the object colour and cannot form an image.

Gamma correction

When working with physically correct lights and shaders we should always use gamma correction in our scene. Setting up a linear workflow is an easy way to manage our colours and textures to ensure that our renders are being displayed correctly. In the mental ray Render Settings> General tab, let's enable Color Management and set our inputs and outputs to sRGB. Now, all we have to do is apply a gamma correction of .45 to our colour swatches and ensure that incoming alpha, bump, displacement, or normal map files are assigned a Linear Input Profile.







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Learn how to

- ☑ Observe real world light and reflections
- ☑ Use the powerful mia_material_x
- ☑ Create realistic materials
- ☑ Use the Layered Texture

Concept

The idea was to create a rather tough-looking knight character with shining metal armour, standing guard at a castle or an outpost.

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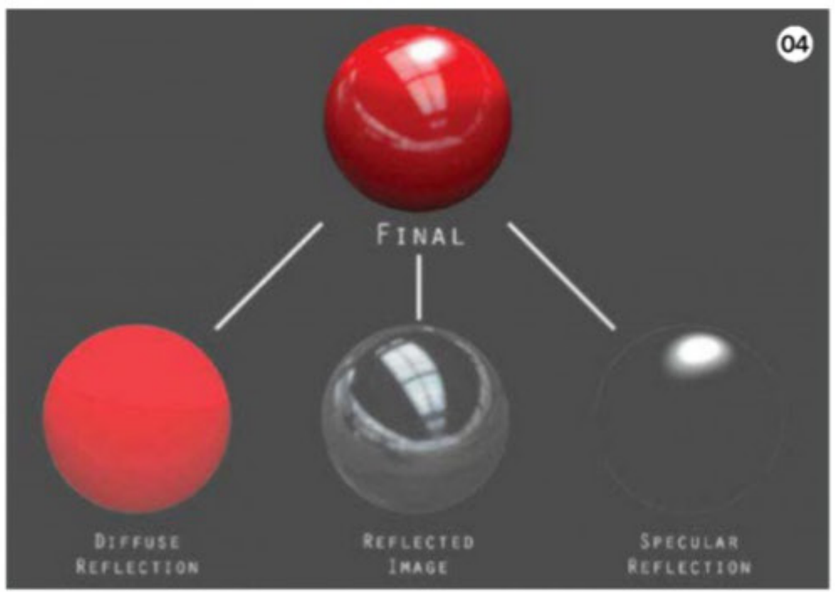
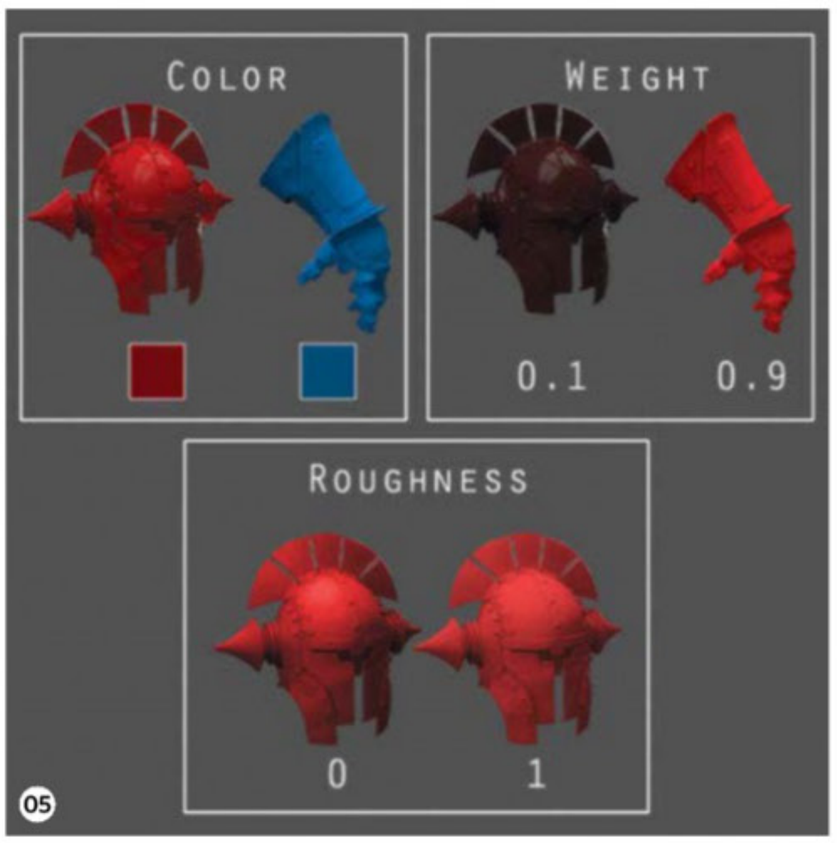
Set the key attributes

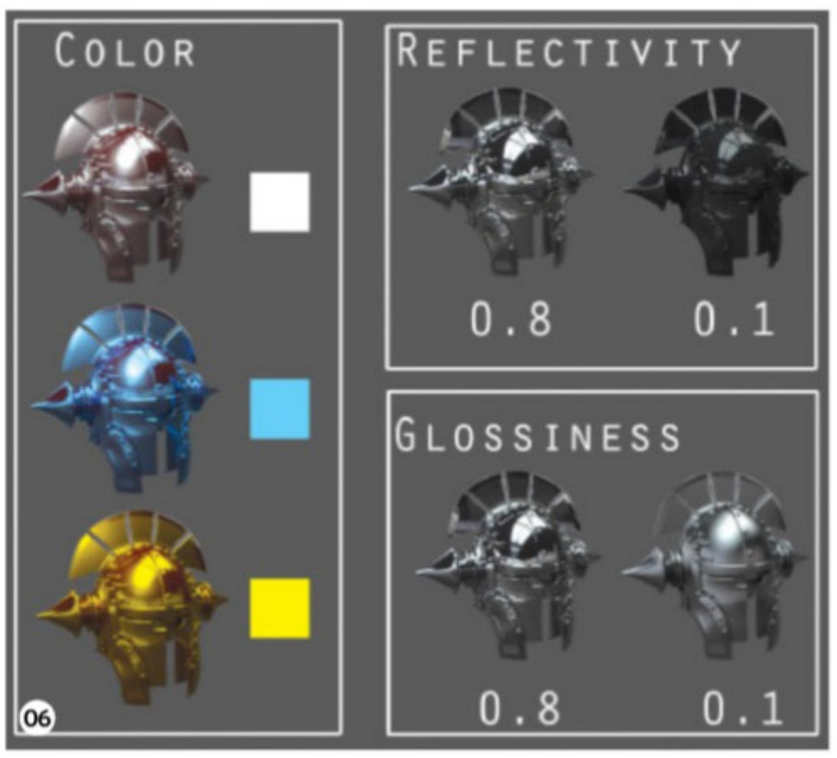
Convert your observations into material attribute values

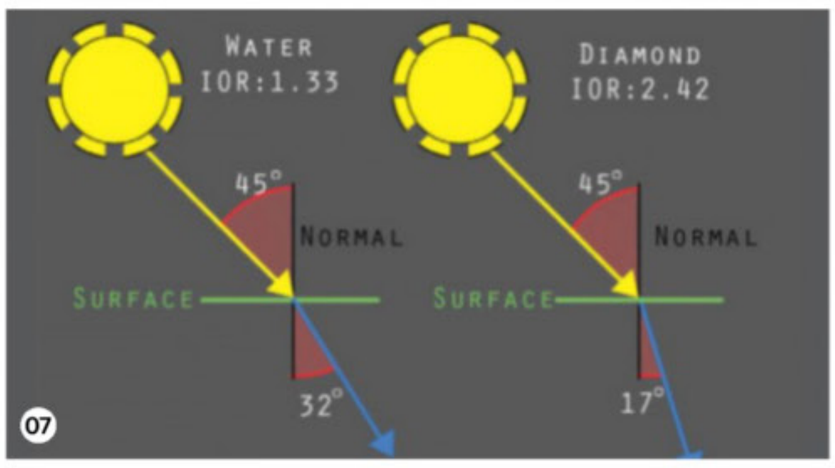


04 Overview of mia_material_x For non-transparent materials, we don't need to concern ourselves with refraction very much. The final reflective properties of our material are the sum of the Diffuse reflections, the reflected image and the Specular highlights. Nearly any material can be simulated through some balance of these three effects. When observing materials in the real world, we should try to consider the way incoming light energy is distributed among these three properties. The shader has an output for each of these components so we can isolate them for compositing if we need to.

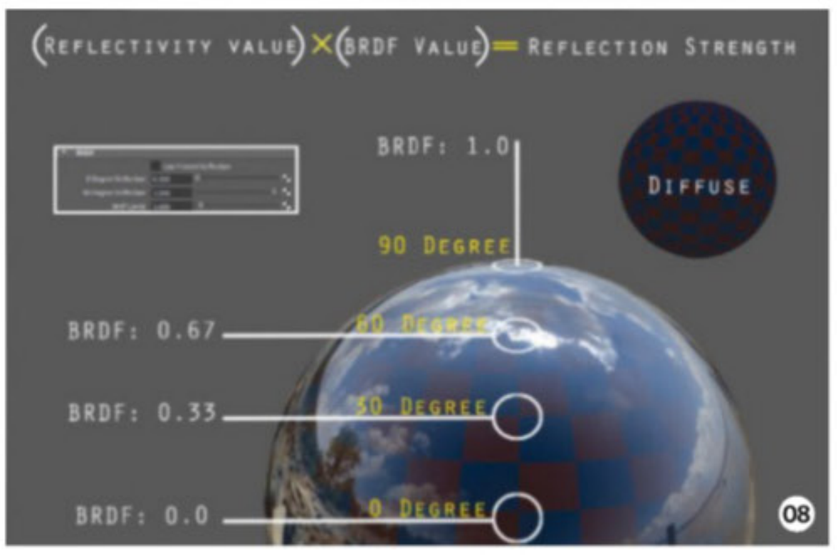
05 Diffuse reflection attributes Let's talk about the Diffuse attributes of the mia_material_x. The Diffuse Color is our main material colour, so it's the light wave frequency that this material reflects. The Weight is the amount of Diffuse reflections. Remember, this value will be affected by the Refraction and Reflection values, as all energy is shared, meaning that if we increase the Reflectivity or Transparency, energy will be taken from the Diffuse Weight. Roughness controls the microscopic surface roughness. Higher Roughness means light energy is less concentrated, and more thoroughly scattered across the surface, creating a more powdery look.







07 Refraction attributes Index of Refraction is the value that indicates the material's optical density, or the speed at which light is transmitted through the material. This is an important factor in determining how light changes direction as it passes from one material to another. Each material has an Index of Refraction, which can be checked online, and we can use this value to calculate refractions as accurately as possible. Transparency is how much light travels through, and the reflectivity value takes energy from this value.



08 BRDF Reflected light is distributed in different directions from a surface at different strengths. Typically more light is reflected toward 0-degrees of the surface than toward 90-degrees. Therefore, if our viewing angle is more parallel to the surface, we catch more reflected light than if it were perpendicular to the surface. Using Fresnel Reflections calculates the Reflective Distribution using the Fresnel equations and the Index of Refraction value we input. Alternatively, we can set our own Distribution values for 0-Degree and 90-Degree Reflections and a Curve value to connect them. These are multiplied with the Reflectivity value.

Light decay

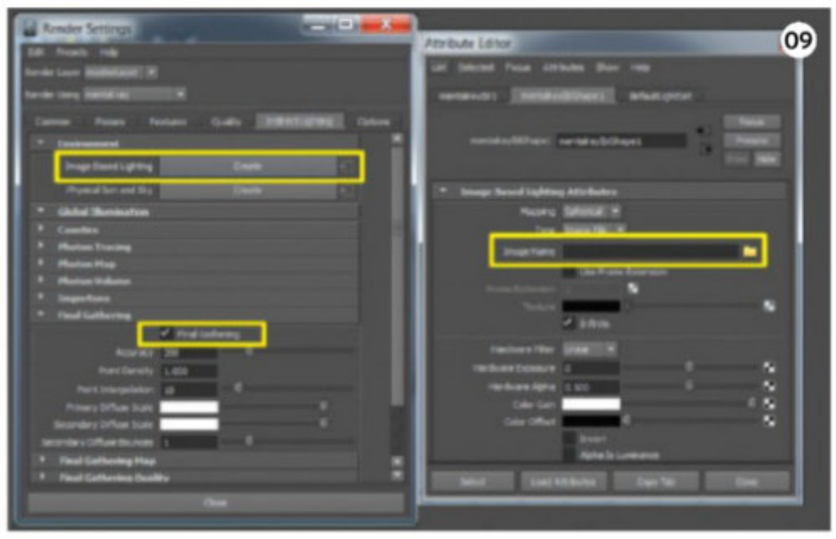
We should remember that in the real world, light decays with distance because as a light wave travels away from the source, it is also spreading vertically and horizontally. This means that the originally emitted photons are less densely concentrated, so the light intensity gradually decreases over distance. The decay of intensity can be expressed as the inverse of the square of the distance. This is Quadratic Decay. To get the most realism out of our materials, we should always be working with realistically decaying lighting systems.

06 Specular reflections Specular Reflection attributes are in the Reflection dropdown. The Color of the Reflection is simply the overall colour of the reflections. Reflectivity contributes to the overall strength of the Reflections, so the reflectivity value should be multiplied by the set BRDF values, which are based on the camera viewing angle, to determine the final Reflection Strength. Glossiness controls the clarity or blurring of our reflected image, and a Lower Glossiness requires higher Glossy Samples, which will affect render time. Highlights Only will disable the reflected image, while Metal material will make the colour of our Specular Reflections match the colour set for our Diffuse Reflections.

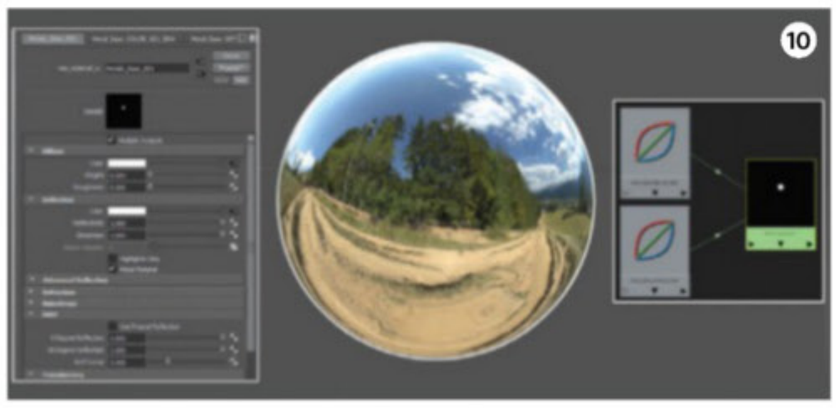
Build the base materials

Create the look for various metal types

09 Use Image Based Lighting To get a good range of light and colour information for our materials to react to, let's set up some Image Based Lighting. In our mental ray Render Settings, go to the Indirect Lighting tab and under Environment hit the Create button for Image Based Lighting. This will create the IBL Sphere around our scene. In the Attribute Editor, under the Shape node, we can plug in an HDR image. There are plenty of free sources for quality HDR images online. Last of all, let's turn Final Gathering is on. We can create additional lights in our scene if necessary.



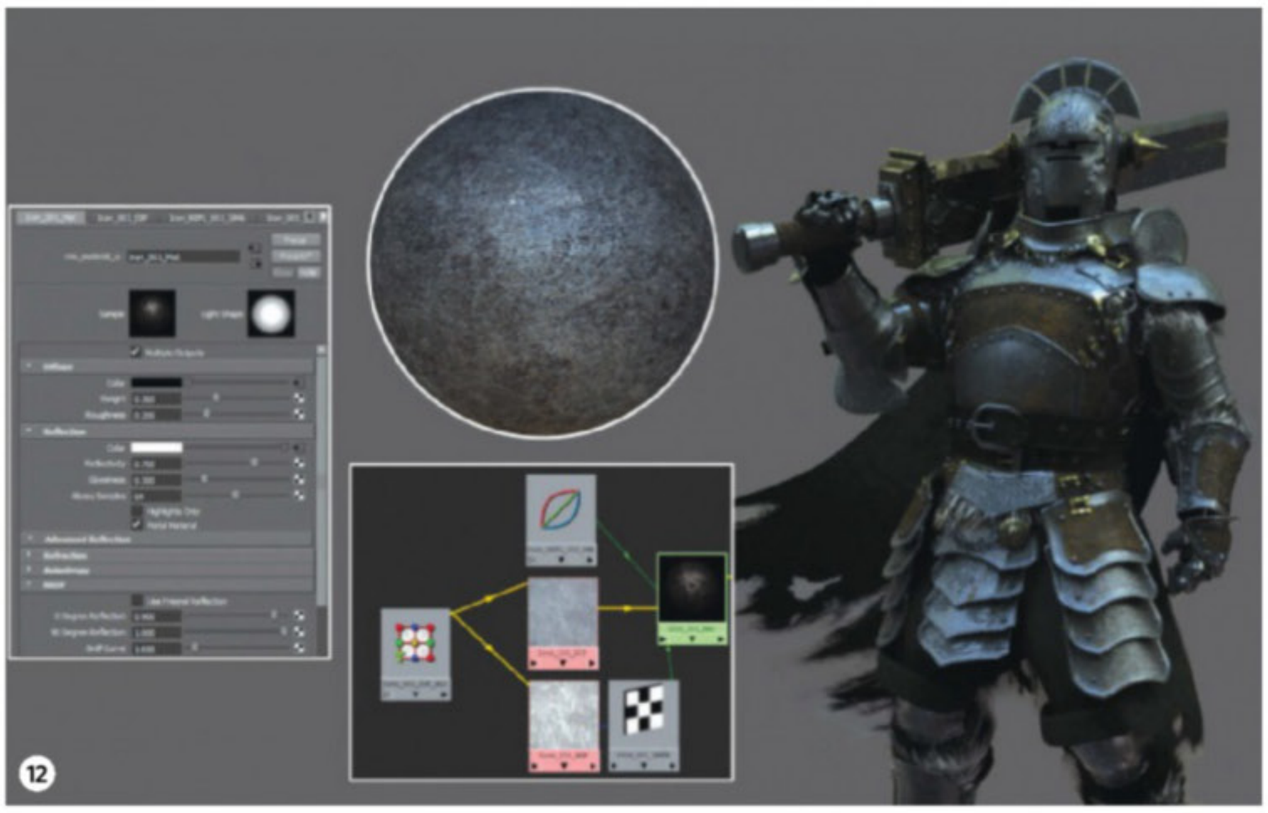
10 Add a metallic base material Let's create a super-reflective metallic base material as a starting point for all our other metals. Later we can add colour and tune it back down to fit each specific metal material. Let's create the mia_material_x node in the Hypershade and name it Metallic_Base. The Diffuse Color should be white, with no Weight or Roughness. The Reflection Color should also be white, with full Reflection and Glossiness. Let's activate the Metal material. In the BRDF, we'll set the 0-Degree and 90-Degree Reflections to 1 and the BRDF Curve to 1.5. Now we have a super-reflective metallic base material.



11 Create a bronze material Let's duplicate our metallic base material and rename it Bronze. Metals influence their Reflections' Color, so by activating the Metal Material attribute, we set the Specular Reflections to derive their colour from the Diffuse. Let's change our Diffuse Color to fit Bronze. Now, we can use reference images to hone in our Reflection values. Bronze is relatively a diffuse metal – it's not highly glossy, and any reflected image will be very blurred. So let's drop the Reflectivity and Glossiness and nudge up the Diffuse Weight. We will increase Glossy Samples, and slightly reduce the 0-Degree Reflection.

Conserve energy

As mentioned, the shading model of the mia_material_x consists of three main components, including the Diffuse reflections, the Specular reflections, and the refractions. The mia_material_x is energy conserving, which means that it will take the total incoming light and then distribute it between the three components based on the attribute values that we input. So, all of the light that interacts with our object is realistically accounted for and no light has been magically lost or added.



12 Create an iron material Worn iron is a very rough metal with varying colours and reflective properties. From our metallic base material, we can use a file texture or a procedural texture to create a rough patchwork of browns and greys for the Diffuse Color. We can use the same texture in the Reflection Color attribute to help vary the Reflection Strength so it is consistent with the Color. Let's bump up the Diffuse Weight and Roughness and significantly reduce the Reflectivity, Glossiness and the 0-Degree Reflection.

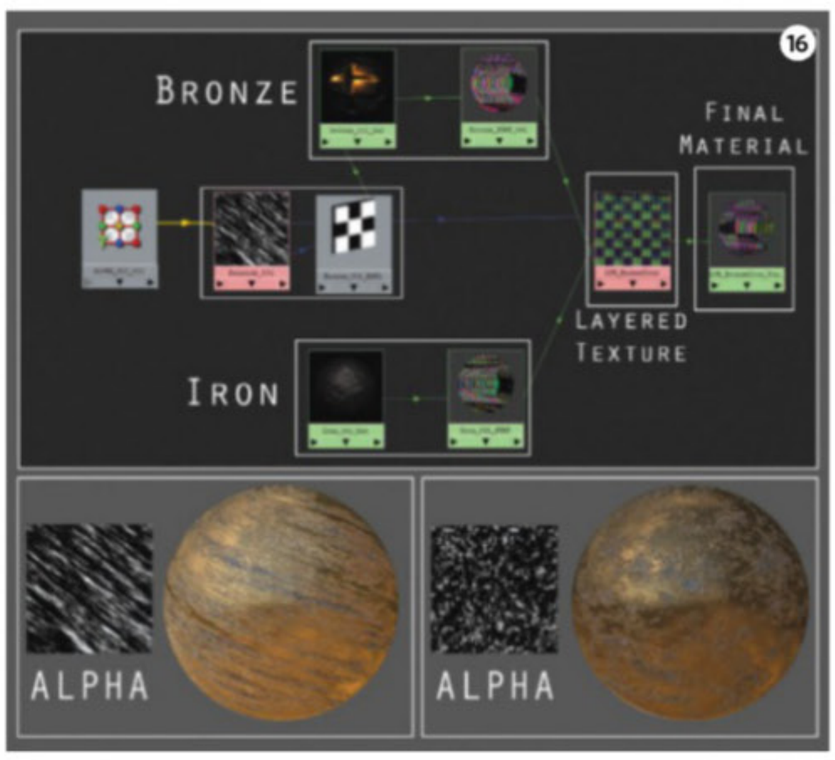
13 Create a steel material Our steel material is highly reflective compared to our Bronze and Iron, but we'll still need to significantly reduce our metallic base attributes to get something accurate. Let's slightly add to the Diffuse Weight, and bump up the Roughness to 0.5. We'll also reduce the Reflectivity and cut the Glossiness in half. The BRDF values will range from .5 to 1 so that we see more reflections and highlights around our edges and curves. It would also help if we plugged a texture into the Reflection Color to create the illusion of both rough and smooth patches.

Scratches, engravings and layers

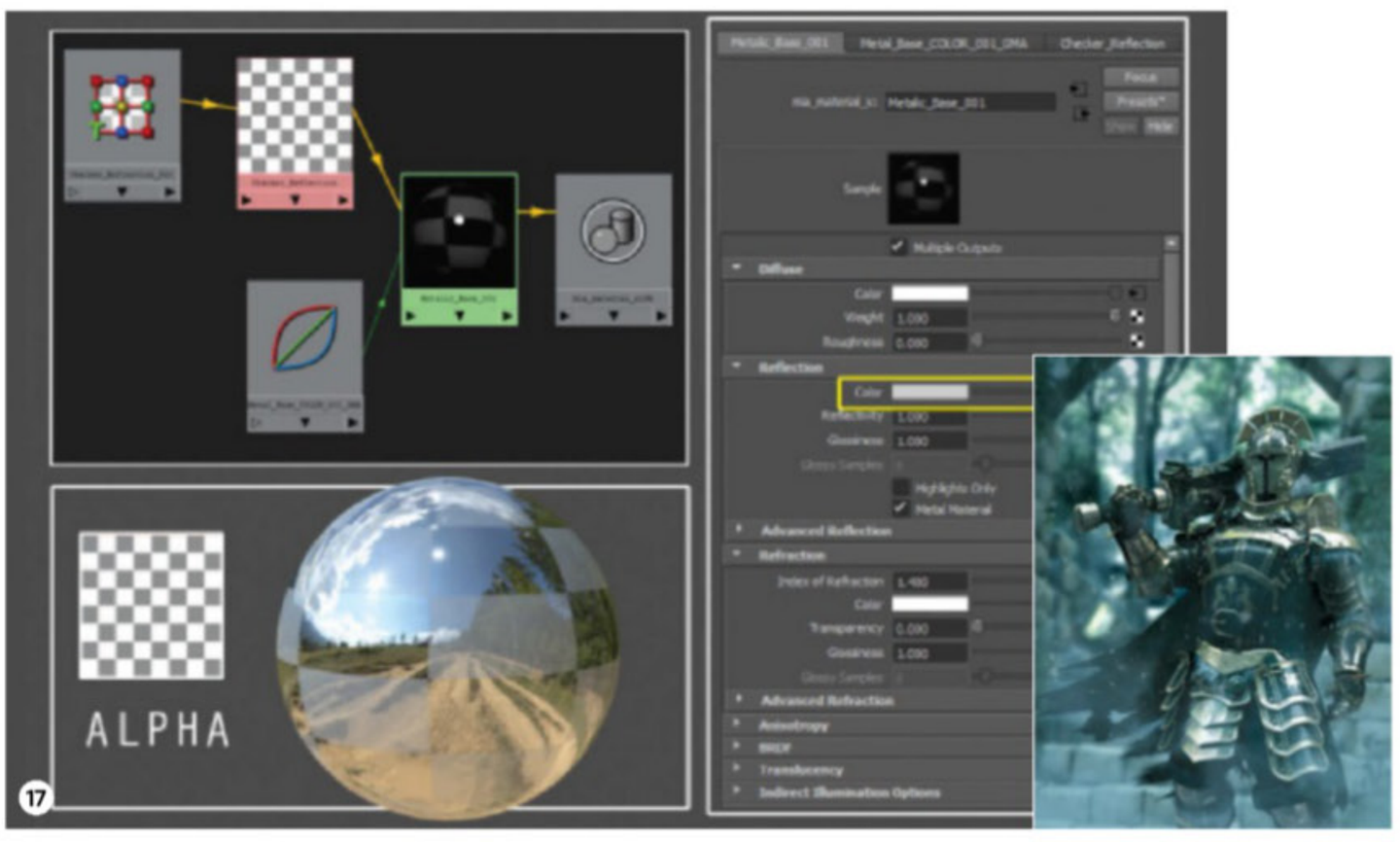
Use Layered Textures to add detail and vary reflections

14 Use the Layered Texture We can use the Layered Texture to stack materials. This is very useful for engravings and scratches where we want to show a sub-layer of our metal that has different reflection properties. The Layered Texture doesn't support mia_material_x, so in order to stack our materials we need to plug them into a Surface Shader. We can create a Surface Shader, and in the Connections Editor we can connect a mia_material_x Result into the Outcolor. Now we can drop the Surface Shader into the Layered Texture node. The Layered Texture stacks from left to right.

15 Add engravings We can create engravings with different materials. Let's say we want to engrave the Bronze with the Iron material. Link both materials into Surface Shaders and stack them in a Layered Texture with the Bronze over the Iron. With our UVs laid out, create an alpha texture for our pattern and connect it to the Alpha attribute for the Bronze node in the Layered Texture. Next, connect the Layered Texture to one final Surface Shader and apply that to our geometry.



16 Create scratches Let's create a duplicate of our Bronze material, then roughen it up and desaturate it. This will be our Scratch material. Let's process it into the engravings Layered Texture, stacking it over the original Bronze material. We can create an Alpha map for our scratches and connect it to the corresponding Alpha attribute in the Layered Texture. We can then use the same Alpha texture as a Bump map to give our scratches some depth.



17 Include Reflection maps The Reflective Color attribute can be thought of as a multiplier for the Reflectivity value. When set to pure white with a value of 1, we get the full strength of this value. Alternatively, if we set a grey colour with a value of .5, we get half the strength of the Reflectivity value in our material and so on. We can use this to add variation to our Reflection Strength by plugging in a Reflection map. A greyscale map with a rough grunge pattern can help give our metals a more worn, rustic look.

Multiple outputs and passes

The shader has an array of different output types, including Diffuse, Specularity, Reflections, Refractions, Translucency, Indirect Light and AO. Each of these output types includes a RAW output and a Level output, which when multiplied equal the Result Output. We can create a material isolating any one of these many outputs for compositing by linking it to the Outcolor of a Surface Shader. Otherwise, we can use the mental ray Passes system to isolate these outputs. However, we would first have to upgrade our mia_material_x materials to mia_material_x_passes in the material attributes, under Upgrade Shader. This is handy to know for this tutorial, particularly when you need to create a series of outputs and passes.

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Artist info

Kimmo Kaunela

3DArtistonline

Username: Kimmokaunela

Website
www.kimmok.siteground.net

Country Finland

Software used 3ds Max, Marmoset Toolbag 2, Photoshop

> Using a simple colour palette will help you to achieve good results throughout the whole project. In this case I used very warm colours that really sell the Eighties feel

Zero Gravity 2014

I was born in 1992, so I never had a chance to live the Eighties era. I like old sci-fi, though, and I wanted to see how far I could go with real-time rendering, so I chose to create an Eighties space station.

“Including small details for the viewer to see is a great way to hint at a story. In this case, I added some photos to create the overwhelming sense of homesickness that you’d get in space. I also created some props to show off the zero-gravity effect”

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Daniele Orsetti

3DArtistonline

Username: dayno

Personal portfolio site
www.dayno.it

Country UK

Software used
Photoshop and MARI

Expertise Daniele specialises in stylised character creation and currently works at MPC

Texture like a pro

Shibaraku! 2014

"Use MARI to effortlessly texture a stylised character"

Daniele Orsetti is a 3D artist specialising in modelling, texturing and grooming for feature films at visual effects studio MPC

In this tutorial I will explain my texturing workflow for a stylised character. We will be focusing on texturing in MARI in the most flexible way possible, as I think that keeping every step of the texture creation process editable until the very end is key to achieving good results, particularly in a production environment.

We'll start by setting up the MARI scene so that it contains everything needed to create textures from start to finish. We will optimise the UV layout and use some MARI features to make our workflow as smooth and efficient as possible.

We'll then focus on creating a colour texture, mixing together procedurals and custom painted layers. To achieve a more easily editable result we'll make extensive use of groups and masks, so that every material is self-contained and can be easily switched on and off.

Once the colour is done, I'll show you how to use the same channel to create quick bump and specular maps, which will be consistent with the previous colour pass.

Finally, we'll set up a shader in MARI to check that all the textures are working correctly and we'll export them as image sequences using MARI's UDIM naming convention, so that we can load them into our preferred render engine.

With the Disc

Tutorial files:
- Katana OBJ file
- Tutorial screenshots

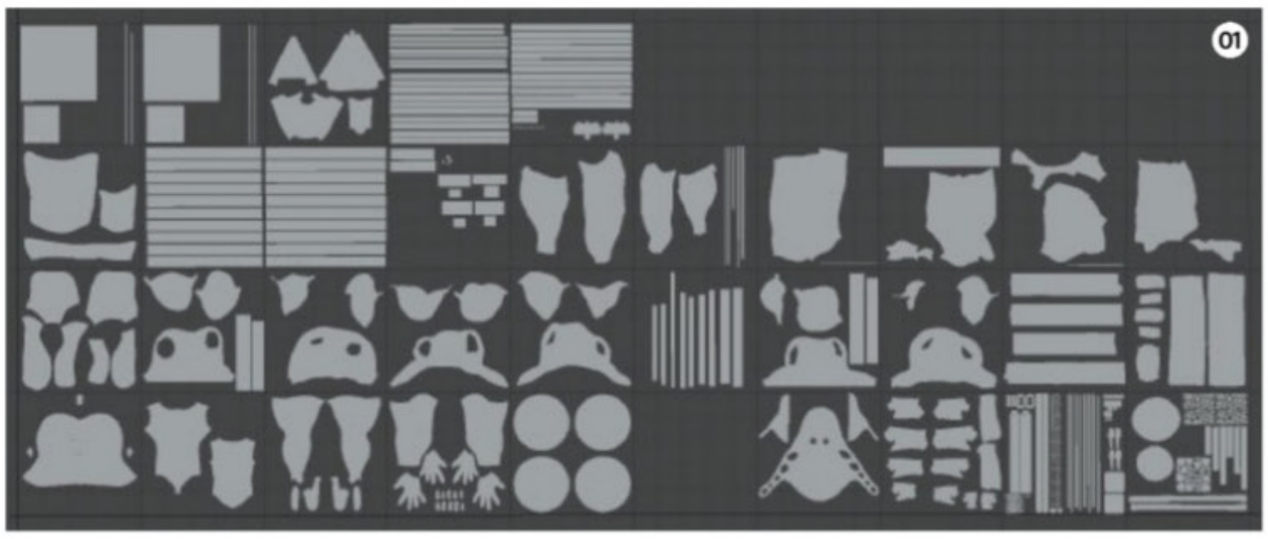
Learn how to

- ☑ Create a flexible workflow for texturing characters and props in MARI
- ☑ Take advantage of the most important MARI features
- ☑ Create bump and specular maps that are consistent with the colour texture
- ☑ Work with shaders within MARI to check your textures

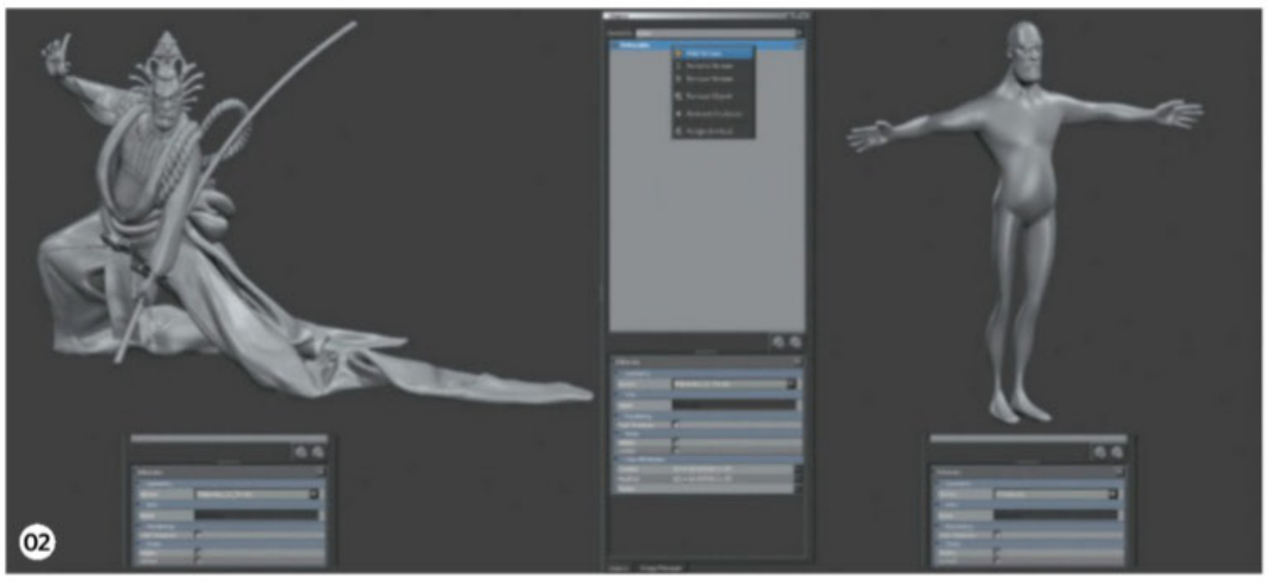
Prepare your scene

Get your assets ready for texturing

01 Optimise the UV Layout MARI has been designed to work seamlessly with multiple UVTiles (UDIMs), so we should take advantage of this amazing feature. Let's position our UV shells in as many UDIMs as we need following the MARI convention: use positive UV spaces, and specifically ten UV tiles along U and as many as we want along V. Even though MARI supports them, it is also good practice to avoid overlappings and to place symmetrical UVs with their pivot along the centre of their UDIM, so that we can easily flip our painting while in MARI if necessary.



02 Work with different versions The character in this example has been modelled in a pose, which can make the texture painting process more difficult in certain areas. A good workaround to speed up the process is to work with different versions of the same mesh, for example a T-posed version of the body can help us to paint symmetrically. Using versions is also extremely helpful for painting on difficult areas such as the interior of a mouth. Create your MARI scene and import the first version of your character by clicking on File>New and then clicking on Loading On Obj in the Geometry Field of the New Project window. Once the scene has loaded we can add as many versions as we want by Ctrl/right-clicking on the character level of the Geometry palette and selecting Add Version. We can switch to the version we need at any time and MARI will keep our layer/channel structure intact.



03 Create selection groups Selection groups provide us with the ability to isolate or freeze parts of the model so they don't get affected by the texture projections. This is another cool feature that can help us to work faster and more efficiently. Creating a selection group is very easy. Click on the Select tool, activate either Patches or Faces Selection mode, make your selection and then click on the Create Selection Group icon in the Selection Groups palette. Repeat the process and create as many groups as you need.

04 Prepare and import source images Right now, the options for editing images in MARI are limited to cropping them and applying filters to them. I used a variety of tileable textures for this project, so I had to prepare them in Photoshop. Once you have processed all the images you need for your project (such as patterns, stencils and texture images to project on the model), you can import them in the Image Manager with a simple drag and drop or by double-clicking in the empty space of the same palette. They can then be used for your MARI project.

05 Ambient Occlusion bake Ambient Occlusion can be used for a variety of things within MARI – we can mix it with textures, use it in a shader to enhance its look, or as a quick mask when we bake a painting onto a model. To create an AO bake, select the model version you want to create the bake from and then click on Objects>Ambient Occlusion. After MARI finishes calculating it we can recall it in any channel by selecting Add Procedural Layer>Object>Ambient Occlusion. AO bakes are based on the geometry, so try and experiment with higher resolution versions of the mesh for better results.

Stay organised

MARI gives us incredible freedom, enabling us to create virtually infinite layers and offering the possibility to nest masks and adjustments at different levels. For this reason, being organised is key to keeping track of what we have created. Rename all the layers you create and colour code them by assigning a colour tag. In this way you can easily isolate whatever you need by using the filters on the top row of the Layer palette. You can filter by type, name, attribute and colour, so take advantage of it!

Work on the colour texture

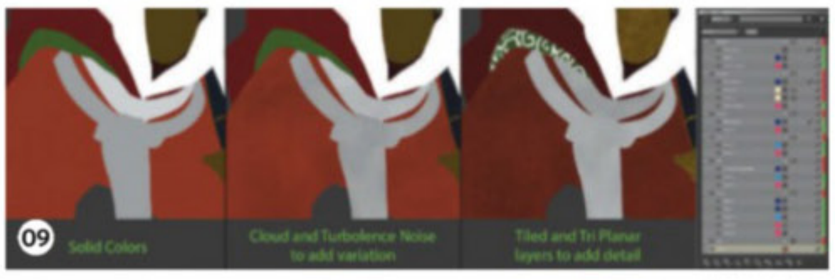
Create a flexible layer setup for the base colour texture

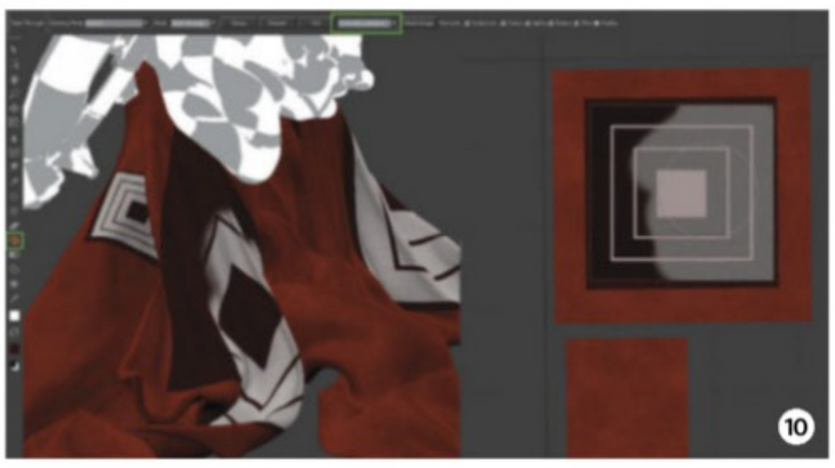
06 Arrange work into groups Start by creating the COL channel, by heading into the Channel palette and setting up the Quick Channel option for a 4K 16-bit texture, then clicking on the grey base colour to create it. To keep our work easily editable we will create a group for every aspect of our texture and we will try to use blending modes only within the groups. In this way, every group will be a self-contained part of the colour texture that we can easily turn off or isolate in a moment.

Triplanar Projection layer

This procedural layer is an extremely powerful tool to quickly block out colour passes in a seamless way. Once you create the layer drag and drop the images you want to tile in its three slots. Start by adjusting the world scale parameter to globally scale all the projections, then individually tweak them with the Repeat, Offset, Angle and Scale sliders. Play with the falloff sliders and curve to make them mix. This layer can also be converted to a raster by Ctrl/right-clicking on it and selecting the Convert To Paintable option.

07 Create masks All our groups will need some sort of masking, so let's start creating some to isolate the different materials. It's handy to use a second channel as a masks repository, where every layer is a black and white mask that can be shared. This way, if we have to edit a mask for any reason, we can just work on its layer in the Masks channel and all the groups will be updated. Create a second quick channel, selecting black as the base colour. Duplicate the layer in the Masks channel and paint masks for gold, fabric and skin.





10 Add decals We can now begin adding custom details, starting with decals. From the Image Viewer, drag and drop a black and white image with the logo you want to project to the 3D scene, which will make MARI automatically switch to the Paint Through tool. Create a new layer on top of the constant colour you selected for the trousers. Set your painted mode to Luminance, pick a colour and start painting through your image. Since some of the geometries are folded, to better paint on them we can either work on the UVs directly or paint on an unfolded version of the mesh.

08 Start with flat colours Select the COL channel again and create the first group for the skin by selecting the Add Empty Layer Group in the Layer palette. Next, click on Add Procedural Layer>Basic>Color and select the base colour you want and move that layer inside the group. Now we want to share the skin mask we created, so select the group and then click on the Add Mask Stack icon in the Layer palette. Click on the mask stack and pin its window (top left icon) so it doesn't disappear, then switch to the Masks channel and press Cmd/Ctrl+Shift and drag the skin mask into the mask stack palette. Finally, delete the default layer from the mask stack palette. Repeat the process for all the groups you want to create.

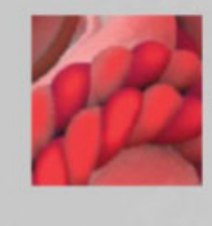
09 Add variation We will now start adding variation using tileable images, which will give a generic look to the character, but will minimise the amount of work in case we have to change the model or add new bits to it for any reason. If the UVs have been unfolded properly, we can use a tiled layer by going to Add Procedural Layer>Procedural>Pattern>Tiled, which will tile the image that we have loaded from the Image Manager directly onto the UVs. Alternatively, we can project our tiled images along XYZ axis using a Triplanar layer, in Add Procedural Layer>Environment>Triplanar Projection. This way we can achieve good results even if the UVs are not perfect. Use the same technique to add colour patterns to the metals and shirts, then add tileable fabric textures and play with blending modes until you achieve a nice and realistic look. Try mixing different Projection layers with masks to create a more complex look. If you just want subtle colour variations, try to blend in noise layers too.

use this to only view the mask
Paint On T-posed model with symmetry
..or paint on ones side and mirror it to the other
Final Result
11

11 Create the face paint Paint is a very different material to skin, so let's start by creating two new groups of red and black paint inside the skin group. Create a mask stack for each group and start painting the ISO texture for the make-up. To only view the layer you're working on – useful when we paint masks – we can select the View Only The Current Paint/Mask from the Shader palette. To speed up the process we can switch on the T-posed version of the model and work with symmetry. Alternatively, if the UVs are symmetrical, we can work on one half of the model and then flip the painting to the other half of the texture (Ctrl/right-click on the UDIM>patches>mirror).

Concept

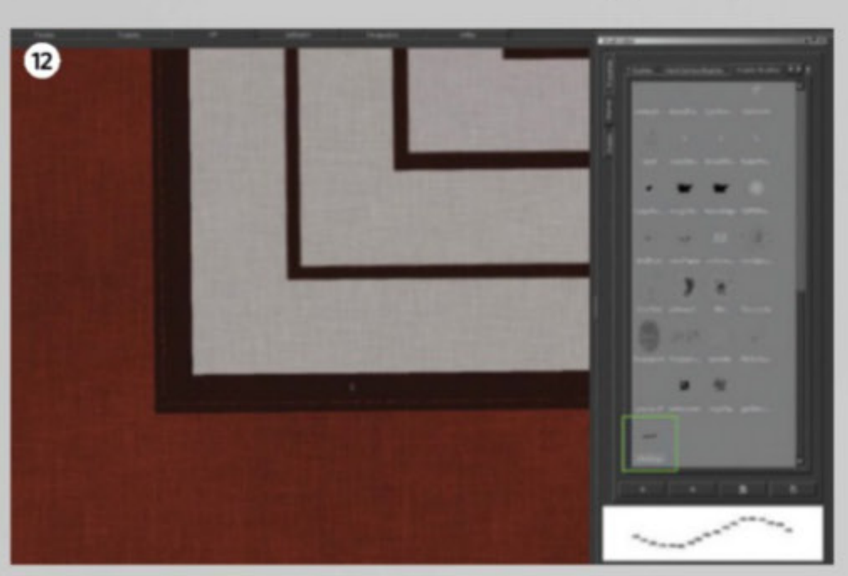
'Shibaraku', meaning 'wait a minute' is the word that the hero of one of the most famous Kabuki plays shouts right before appearing in the scene and saving the lives of innocent people. This character is my personal interpretation of the actor performing that role.



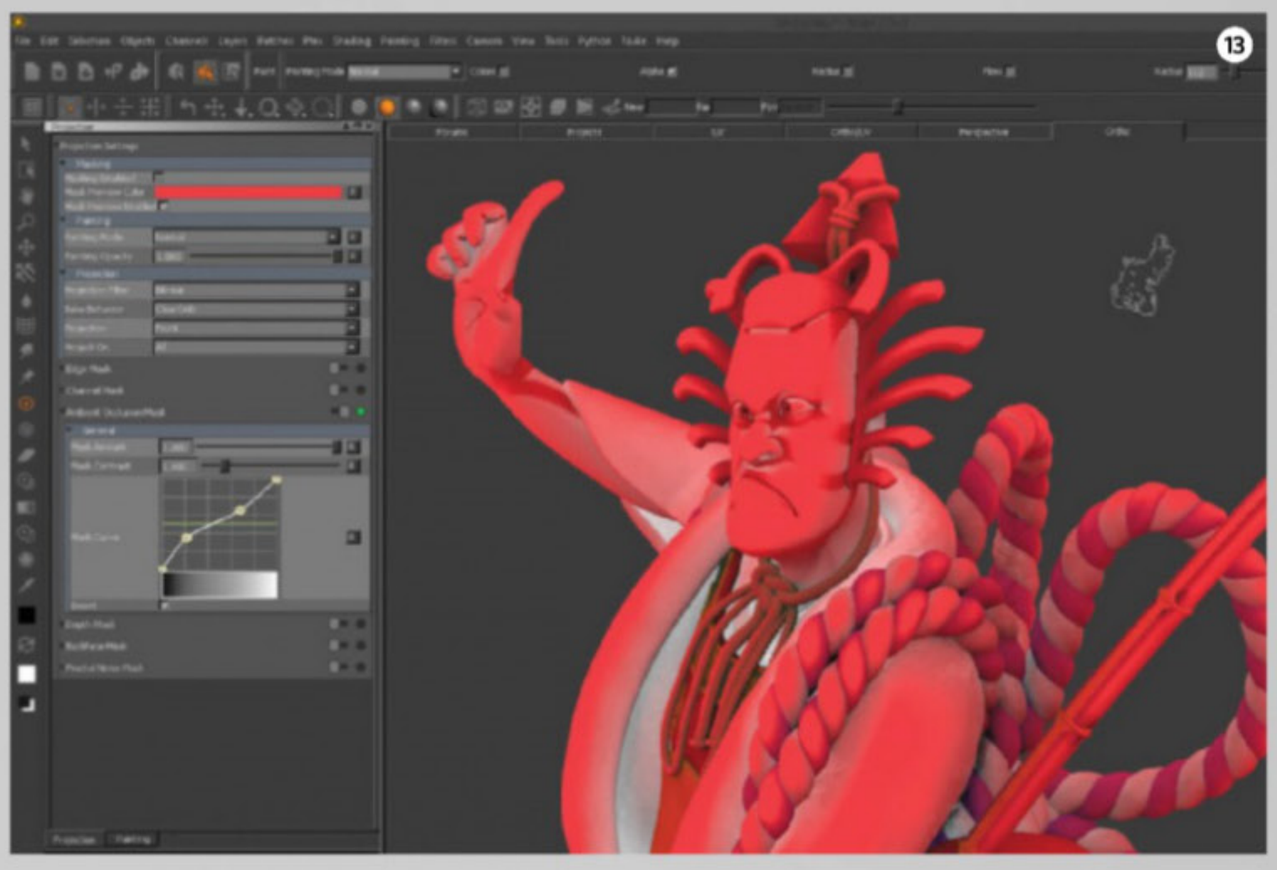
Add details with secondary maps

Create a detailed look using bump and specular maps

12 Paint details with custom brushes Now we can use custom brushes to add more details to our model. Open the shelf palette and pick the Stitching brush from the Organic Brushes tab and paint the stitching of your trousers and shirts in separate layers. Next, pick the Metal Scratch brush from the Hard Surface Brushes tab and paint some scratches on the edges of the metallic objects. Keep playing with other brush presets and add detail on either colour layers or the Masks channel to create more interesting blendings.



13 AO-based dirt pass As a final touch we can create a quick dirt layer based on ambient occlusion. To do this, create a new layer at the end of your stack, then activate the Ambient Occlusion Mask from the Projection palette (this will only work if we have baked an Ambient Occlusion for the version of the model we're working on). You can then paint dirt wherever you wish using various custom brushes. Tweak the Ambient Occlusion sliders to mask bigger or smaller portions of the model before you bake the painting.



14 Duplicate COL map to create secondaries The bump and spec maps should follow what we created in the Color map. Let's select the Color channel in the Channels palette, then copy and paste it twice to create two new versions of it in the same palette. Rename them Bump and Specular. Alternatively we can create two empty channels, share the colour one inside their layer stack, and use adjustment layers to generate the Bump and Specular channels. This last method gives us quicker results, but doesn't let us fine-tune the maps, which is why I usually prefer to create unlinked duplicates of the Color channel instead.

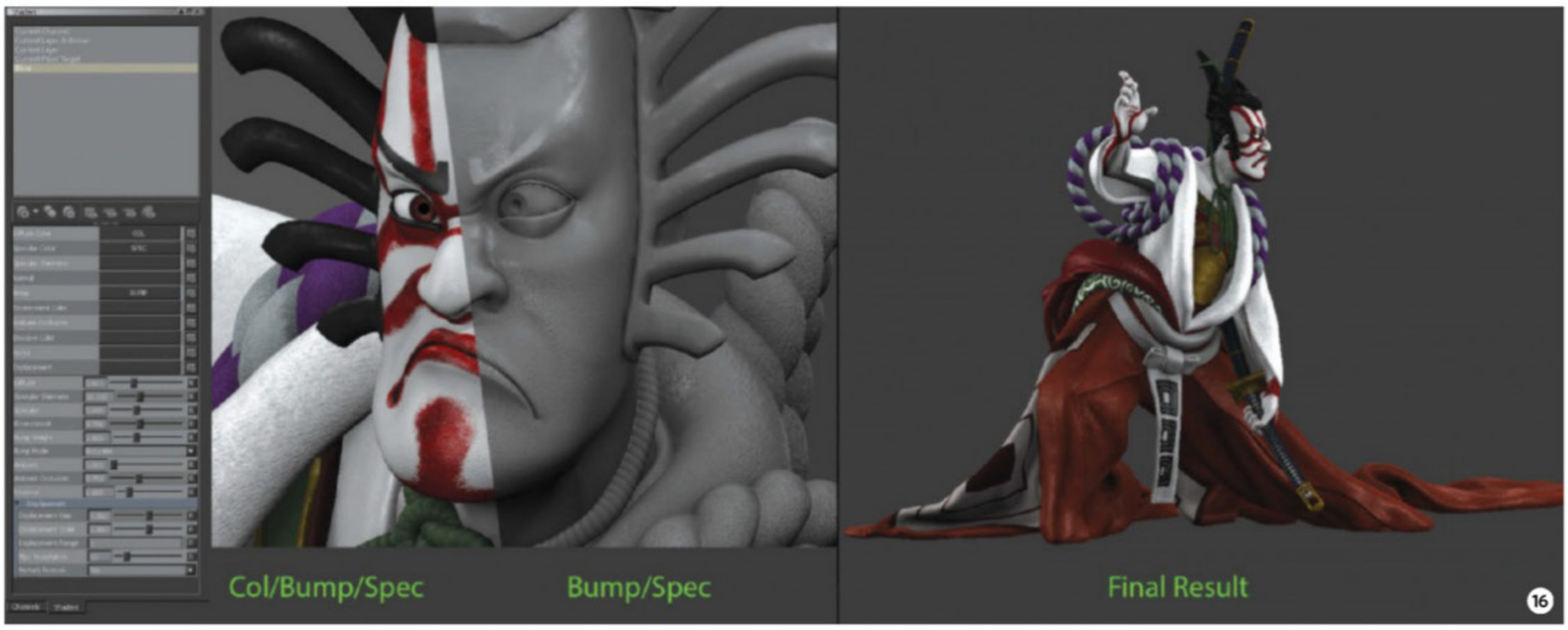
15 Tweak the bump and specular maps This is the point where being organised will pay off. Filter all the basic colour layers and assign them the specular colour you want (e.g. white for shirts and trousers, yellow for gold ornaments). Open every group and fine-tune the patterns and blending modes to achieve the look you want for both bump and specular. Add grade layers to the specular groups to give it a nice contrasted look. Since we'll only use the Luminance value of the pixels in the bump map, we can put a saturation layer on top of the stack using Add Adjustment Layers>Saturation and set it to 0 so we can only focus on its grey values.

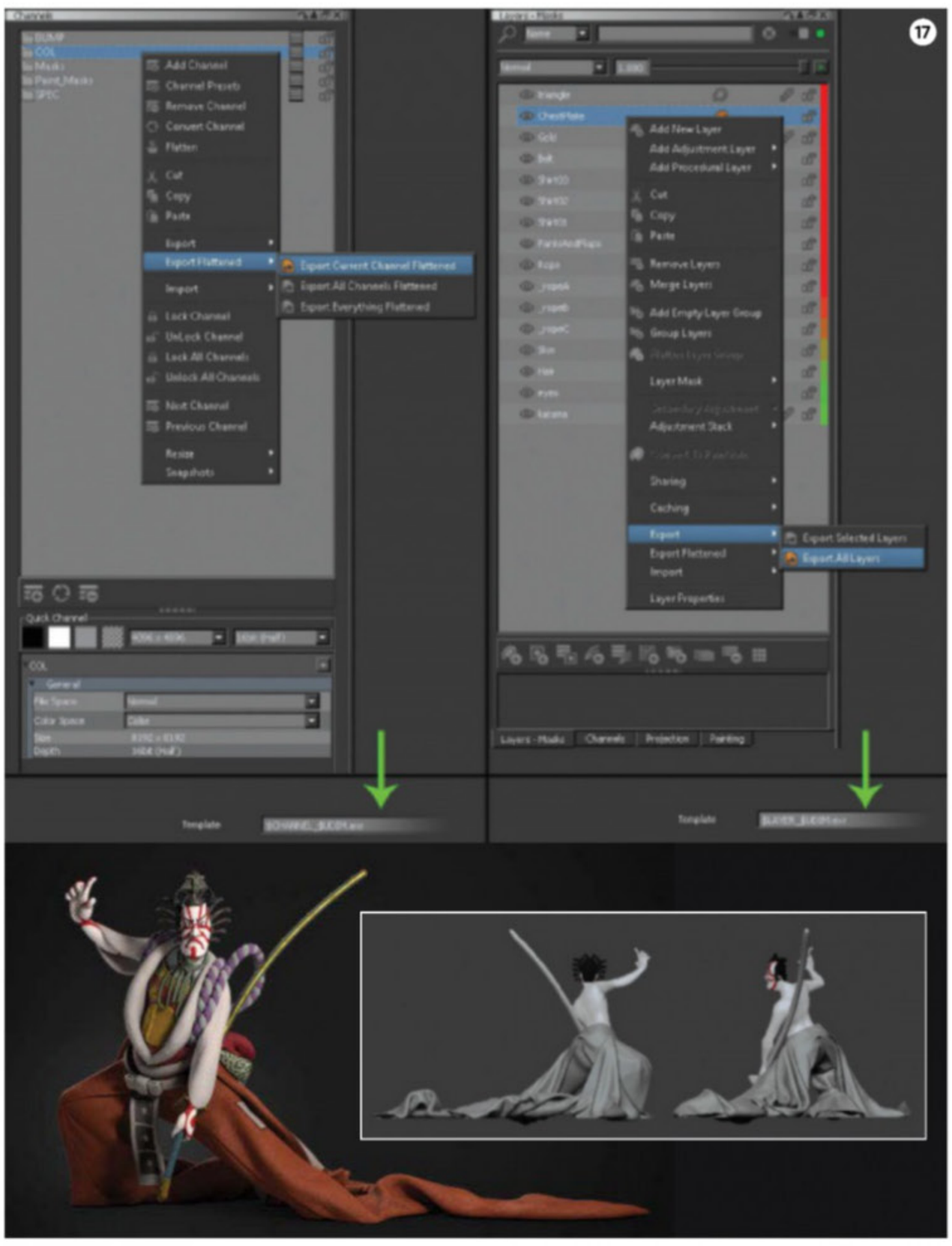
Cache your layers

Channels in MARI can become very heavy on hardware and you'll probably experience slow down if you make MARI calculate all the layers within a channel at the same time. For this reason, it's always good practice to cache the layers that you're not working on, so that the software can use all its resources where you really need them. You can easily cache single layers or groups by Ctrl/right-clicking on them and selecting Caching>Cache Layers. If you then need to further edit them, you can always uncache them from the same menu. MARI colour-codes the layers so we can easily recognise them, usually with red to green for uncached ones (according to how heavy they are becoming on the hardware) and cached ones in blue.

Check and export all the maps

Test your textures with a MARI shader before exporting





16 Create and edit a shader Before exporting your textures, you should check the end result in MARI. Create a Blinn shader and plug your channels into the Diffuse, Specular and Bump slots, then tweak the shader sliders to achieve the result you want. You can also use your baked ambient occlusion to enhance to look of the model inside MARI. If the textures are not behaving in the expected way, you will need to go back to your channels and tweak them. You can edit every layer while still using the Blinn shader to get instant feedback on what you're doing.

17 Export channels and layers Now that you've finished creating your model and you're happy with the result in MARI, you can export the channels as image sequences to be used in your preferred render engine. To export a channel, Ctrl/right-click on it and select Export Flattened> Export Current Channel Flattened. The masks you created in your mask repository will also come in handy for compositing purposes, so export them too by selecting the layers that you want to save and Ctrl/right-clicking on Export>Export Selected Layers. Use the $CHANNEL and $LAYER tags when you are saving your images so that they can grab the name that you gave to them in MARI automatically.

Use the channel snapshots

Snapshots enable you to save different versions of a channel that you can recall at any time. This can be very handy, particularly in a production environment where artists are required to create different iterations of the same texture almost daily. You can also use it as an internal history tool for a particular channel. To create a snapshot, Ctrl/right-click on the channel and select Snapshots>Snapshot Current Channel. You will then see them appear in the Snapshot palette, which will let you create new ones, delete them, or extract any snapshot to another new channel.

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Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Mike Jagodzinski

3DArtistonline

Username: mjag07

Country USA

Software used MODO, MARI, Quixel SUITE, Photoshop

Expertise Modelling, texturing, rigging and animation, specialising in MODO and MARI

Model in MODO

Crimson Dagger 2014

"Learn how to build a Cobra helicopter for your next-gen game project along with a dramatic cinematic still shot"

Mike Jagodzinski is a freelance 3D artist

INSERT THE DISC for in-depth video tutorial

With the Disc

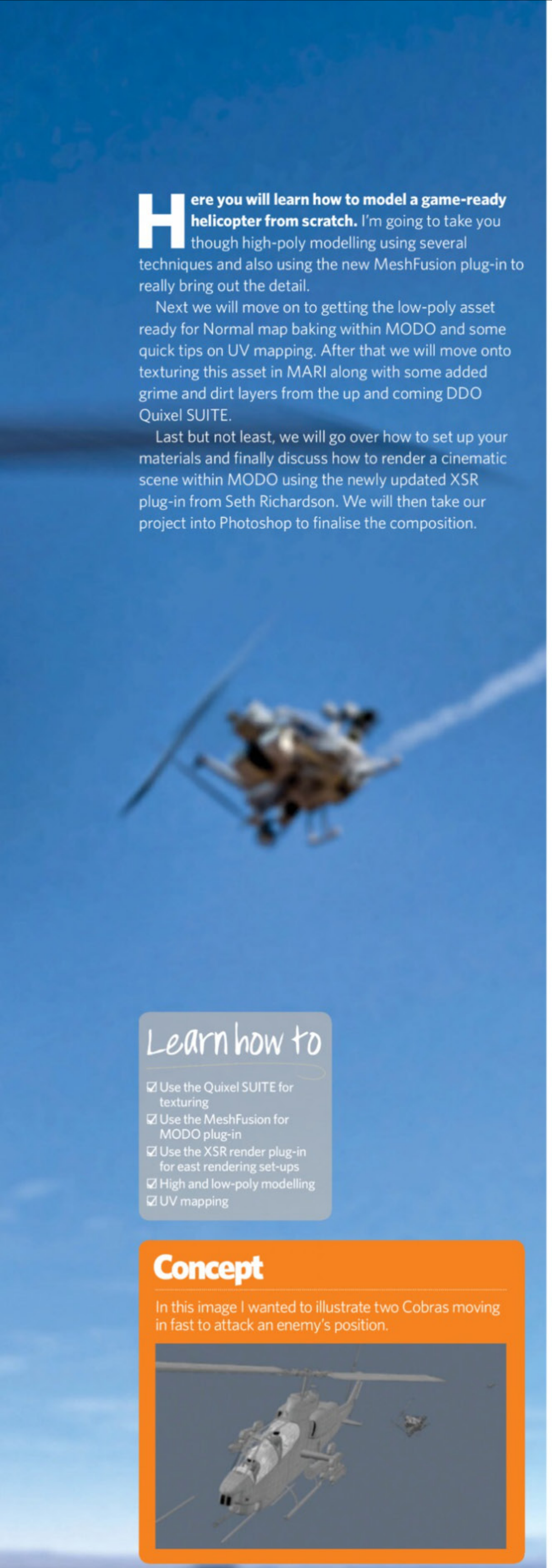
Tutorial files:

- Full scene file
- Cobra base model
- MARI project files
- Tutorial video
- Tutorial screenshots

Here you will learn how to model a game-ready helicopter from scratch. I'm going to take you though high-poly modelling using several techniques and also using the new MeshFusion plug-in to really bring out the detail.

Next we will move on to getting the low-poly asset ready for Normal map baking within MODO and some quick tips on UV mapping. After that we will move onto texturing this asset in MARI along with some added grime and dirt layers from the up and coming DDO Quixel SUITE.

Last but not least, we will go over how to set up your materials and finally discuss how to render a cinematic scene within MODO using the newly updated XSR plug-in from Seth Richardson. We will then take our project into Photoshop to finalise the composition.



Learn how to

- ☑ Use the Quixel SUITE for texturing
- ☑ Use the MeshFusion for MODO plug-in
- ☑ Use the XSR render plug-in for east rendering set-ups
- ☑ High and low-poly modelling
- ☑ UV mapping

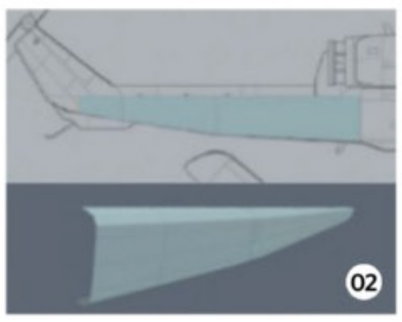
Concept

In this image I wanted to illustrate two Cobras moving in fast to attack an enemy's position.

Start modelling

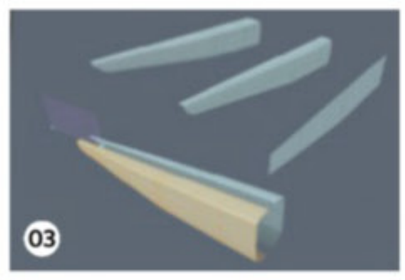
Set up reference images for the helicopter

01 Import reference images The first thing we need to do is get our reference images ready. Open a new scene in MODO, click the Item tab and Add Backdrop Item. In the Backdrop Item Properties select the reference image. You can then edit the Projection type, so from the Right, Left, Front and so on. One thing to consider is scale – I always build in real-life scale with as much relevant information as possible about what it is I'm creating. As I have the dimensions handy (length 13.6m, height 4.12m) I will add some reference geometry to get a feel of the size. By doing this you can ensure the reference images you're using are scaled correctly. Once everything's set up you can delete the reference geometry.



02 Build the fuselage In this project, the best place to start modelling is the rear tail portion as it's a pretty simple shape and it will give us a good base to build upon. Start with a simple plane and extend the edges using the hotkey Z, working from the right-side view only. From there we can define the shape further by extending the other edges and using the front, top and right cam views to finalise the basic shape.

03 Continue high-poly modelling Click the Tab button to activate SubD mode on the selected mesh. You will notice that you've lost some of the form, so we will need to add supporting loops/edges. Keep adding edges to define the shape of the tail so we have everything looking as it should be. Personally, I try to model just half and then mirror the other half once I've achieved the shape. To duplicate the model, click the Geometry>Duplicate>Mirror.

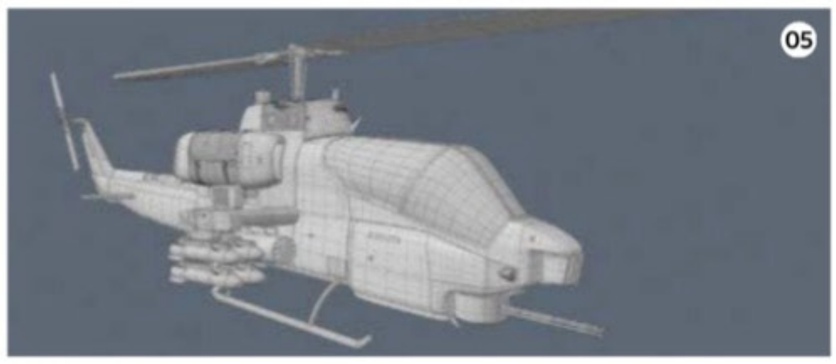


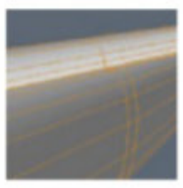
04 Use MeshFusion After we get a good base high-poly model using the above steps, it's a good idea to duplicate it for later use in the low-poly portion of this tutorial. From here we're going to keep adding detail using the MeshFusion tool for MODO. Let's grab the portion of the model we're going to edit for this step. We can also use one of the Qbics that ship with MeshFusion as a cutter. Next select both the Fusion asset and the portion of the model that you're going to edit. Click New Fusion Item and then subtract the first selected from the others. After that, MeshFusion will use the Qbic as the cutter and you will be able to get some panel lines in the high-poly mesh. You can use this process throughout your high-poly modelling to add impressive levels of detail.

Modelling panels

For this project, I jumped off the deep end. I wanted to model all the panels on the fuselage. The issue with this workflow is that it adds a lot more time, whereas you can get the same effect by just adding the panel lines in the texturing phase of the project. The approach is up to you!

05 Finish high-poly modelling Keep building out the high-poly helicopter until complete – you can find the finished asset supplied with the issue. You may notice I did end up modelling each major panel, and that I used a little bit of SubD, Normal polys and also quite a bit of detail added with MeshFusion to achieve the final look.

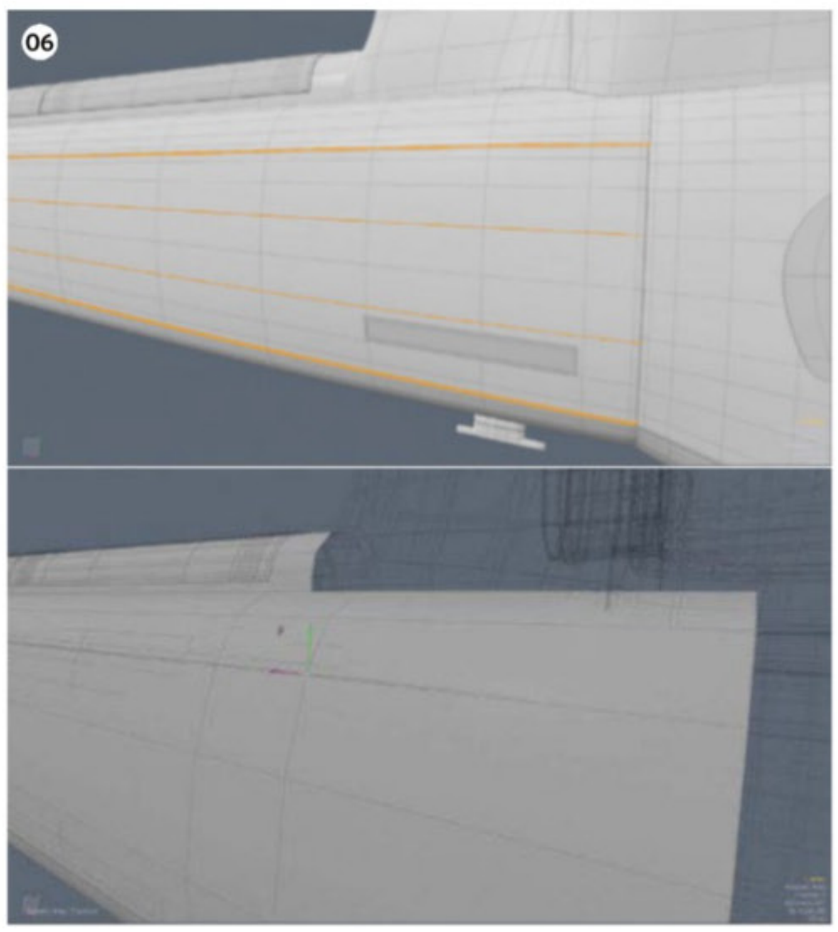


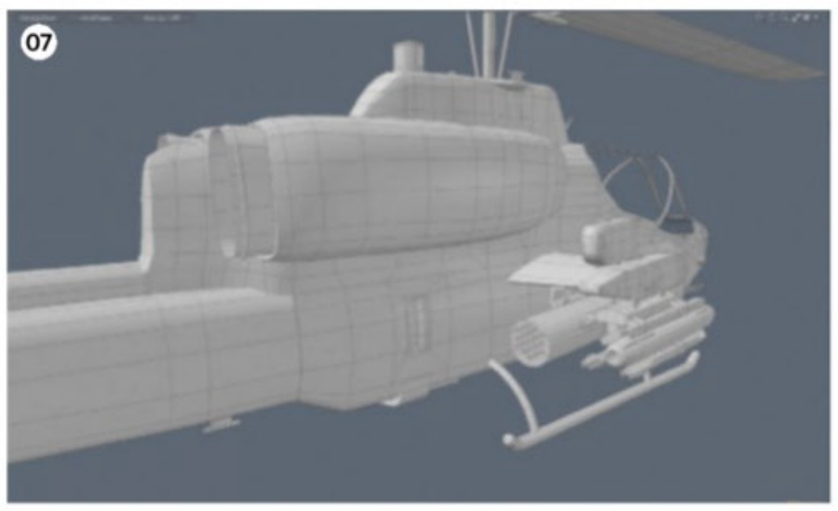


Low-poly modelling

Break down the high-poly base mesh into a usable low-poly mesh

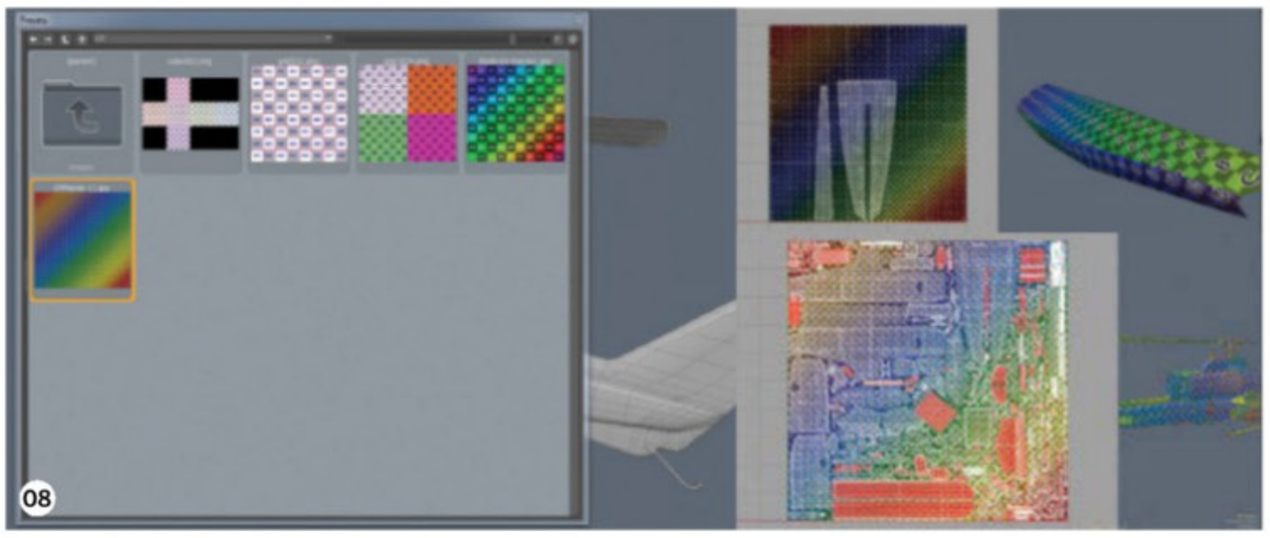
06 Low-poly modelling Open the saved low-poly mesh. All we have to do is to remove any added supporting edge loops and any unnecessary edges, while trying to maintain the basic form. You may find that you have to add a few edges here and there to do that. One thing that does help in this process is setting the high-poly mesh to the background by using the updated Snapping capability. All you have to do is make sure the Snapping is On and is set to Geometry Snap, with Layers set to Background. This will help you to keep the form as you remove edges.





07 Finalise low-poly modelling After we've removed any extra edges and geometry from the base mesh, we should have something that is very usable within a game engine. From the start, set a target poly count to around the mid-twenties, which should give a tri-count of around 45k. You can check the Normal poly count in the Stats panel and the tri-count in the GL count. We also need to remove anything that's not needed from the reference images, so run a mesh clean up by going to Geometry>Mesh Clean Up.

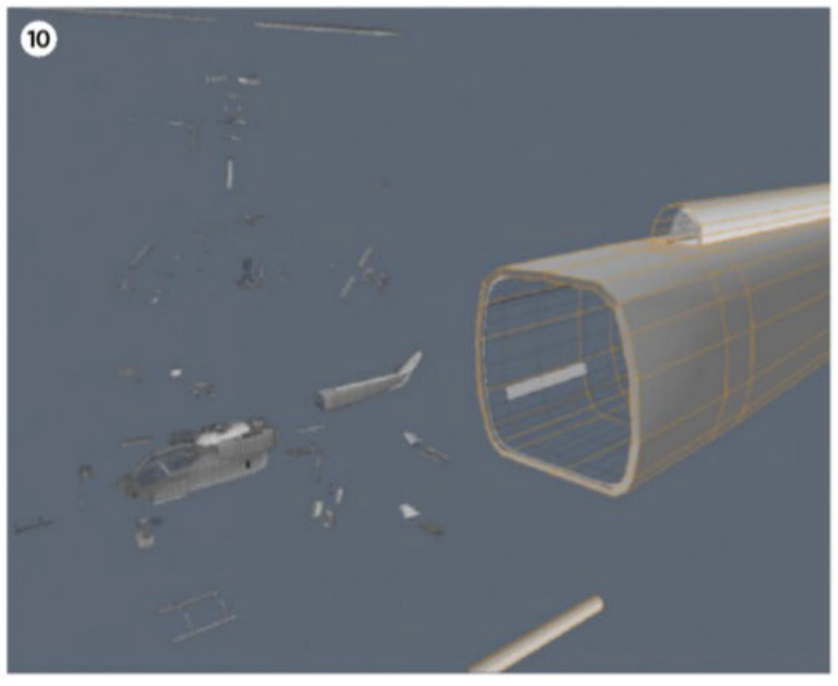
08 UV mapping Before we start UV mapping we have to get an idea of how many maps we can use. We're only going to use one map for the exterior, one for the interior and an additional one for the glass. That way we can adjust the size of each, creating one for game resolution and one for cinematic resolution. Start by adding a UV mapping image to the shader tree above the base material. Next, click the UV tab. We're going to select a few edges and click the Unwrap tool button. From here we can reselect each portion of the mesh in the UV grid and get the mapping correct. The UV Mapping tool has had updates in speed and usability, which makes the process quick and painless.



Add detail to the normal maps in MARI

For the rivets, add in a separate channel and apply them to the model on a new layer. After this, share those layers with the Normals channel and add an adjustment stack to that layer. Finally, add a Height to Normal adjustment. Using this procedural you can also add dents and bumps among other details very easily.

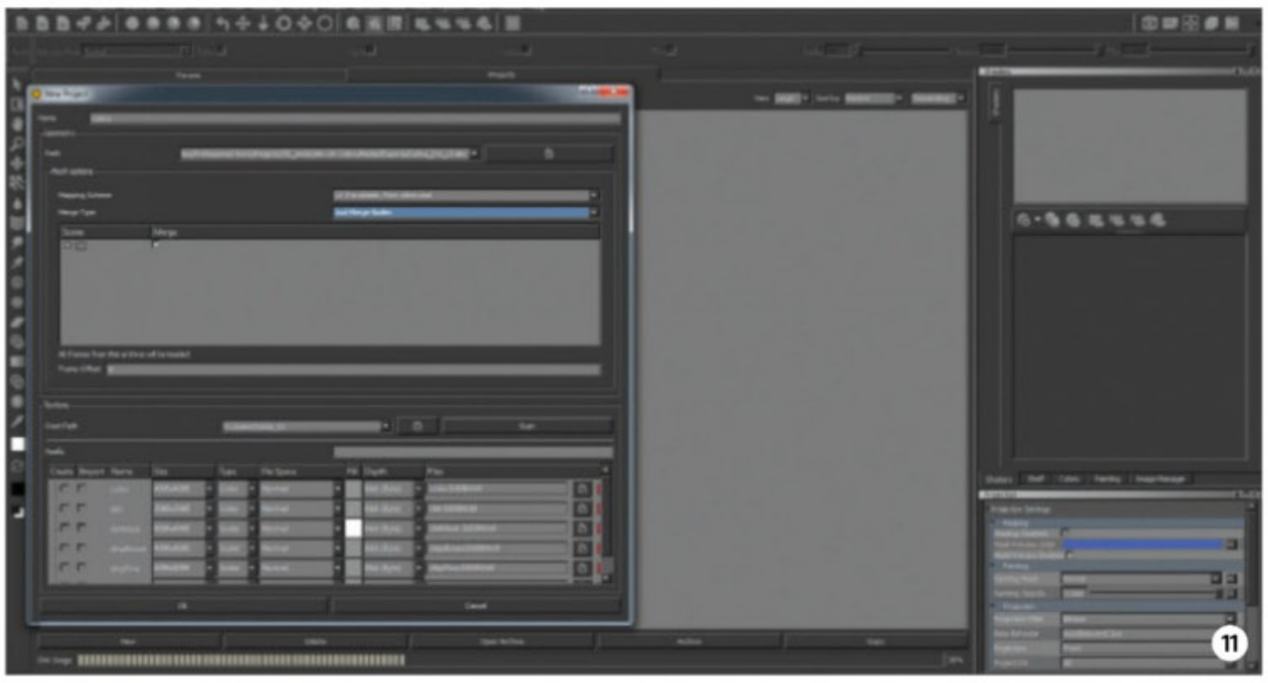
09 Bake Now the mapping is complete and packed up we're ready to do some baking. We're going to bake out some Normal maps and also an AO map that we can use for texturing. We're going to use the Cage Baking option and also the new Baking UI. Let's move over to the Render tab, so we have the high-poly and low-poly loaded into the same scene. Give each its own material – the high-poly one with a smoothing angle of 40 and the low-poly with an angle of 79. Click Add Layer then click Render Output and add an Ambient Occlusion output. From here we want to click the Baking UI tab to access the Properties. Click Outputs and select Cobra LP as the Object to bake. Select the AO output, Image Map Size and Destination and then click Bake.



10 Finalise the bake From here we need to expand our model and set up a bake cage. The first part is quite simple – we just need to move the low-poly and high-poly portions away from the other parts to get minimal baking errors. Now select the low-poly model and create a Morph map. This will be used for the cage while baking. From there, with the Morph map selected, we need to adjust the distance. Click Deform and use Push to move it just enough to cover the high-poly model. Back to the Baking UI, set the Target and Source Objects as well as Bake Size and Destination. Click Render and we're ready to start texturing.

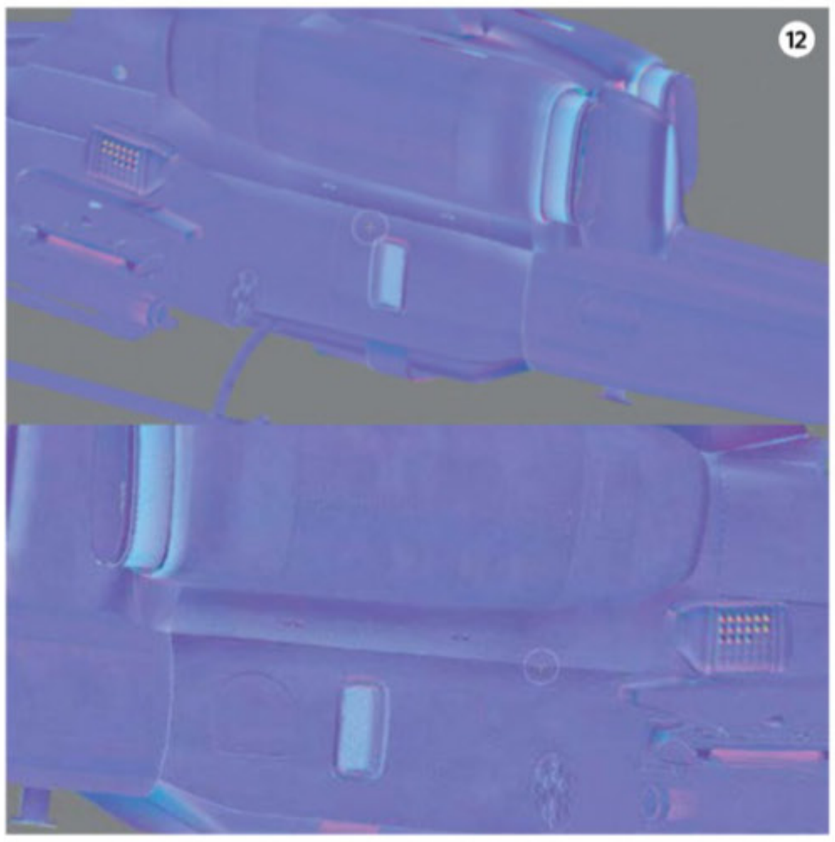
Texture the Cobra

Use MARI and the Quixel SUITE



11 Set up your MARI project Now we have all the necessary maps, we can export a version of the low-poly model that is not expanded. We are going to export an alembic file format for this project. Next, let's open MARI and get texturing. First of all, go to File>New>Create A New Project. Fill in the path of the exported model and root path of the textures and then click OK.

12 Normals Before we get too deep into texturing, we want to make sure that we get the Normals nailed down before doing anything else. Create a new channel and label it Normals, then click on the new channel and go into it. Let's import the baked Normal map into the first layer. To do this, ctrl/right-click on the layer and then choose Import Into Layer. Fill in the information and click Import Patches. We need to add detail into the Normal map, such as rivets and dents where the Cobra may have taken damage.



13 Continue texturing Now we can really get into the texturing. When I'm texturing, I generally start by adding the base colour layers, then adding some tiled textures to break up the base colours. I also mask out a few of the tiled textures to give some more variation to the colours. Another thing that I try to do is to add more detail, such as darker panels and extra dirt. Sometimes I import the AO bake into a layer and set that as a Multiply Blend mode.

DDO Quixel SUITE

I recently added the new Quixel SUITE to my workflow. I found it very speedy. It also enables me to layer several variations of dirt and grime to my model in MARI very quickly.

Artist Showcase

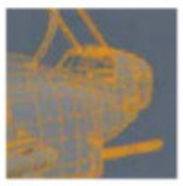
Mike Jagodzinski

Based in southern USA, Mike Jagodzinski is a freelance 3D artist with an interest in hard surface modelling and texturing. He began using MODO 401 several years ago and has since picked up several aspects of CG art. For his projects, he predominantly uses programs such as The Foundry's MODO, MARI and NUKE, in addition to ZBrush and Photoshop. You can see more of his work over at www.behance.net/MikeJagodzinski

Sherman_M4 **MODO, MARI, Houdini (2013)**
This model was created last year to test out rigging. I'm hoping that I can use it for an animation at some point in the future.

STG_44 **MODO, MARI (2012)**
This model was created back in 2012 to use in one of my personal diorama projects.

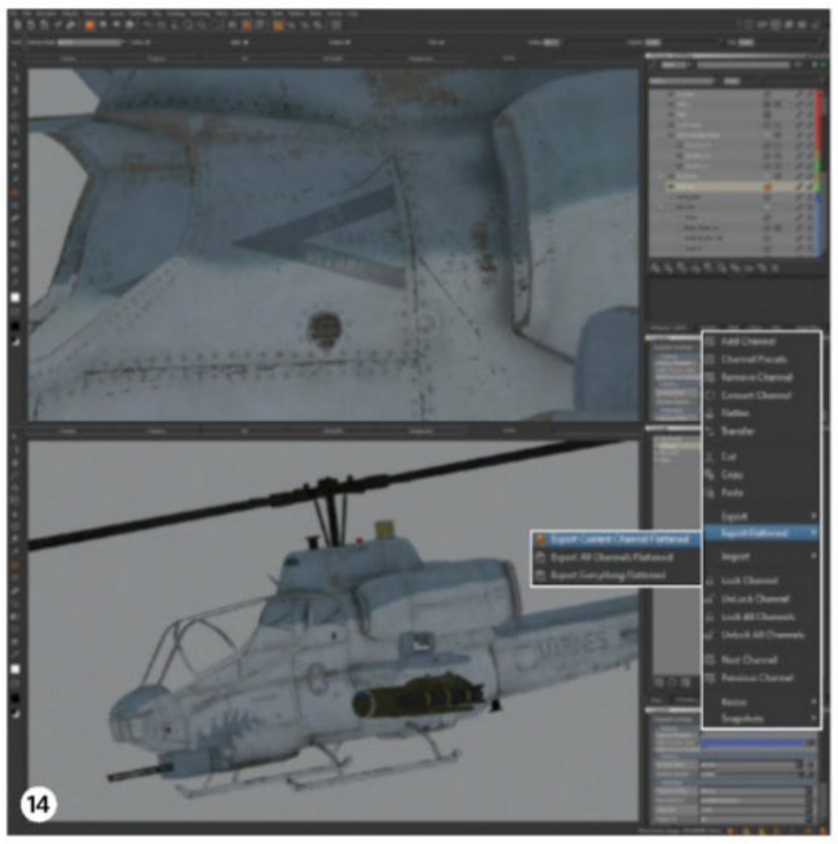
Dolphin **MODO, Photoshop (2010)**
This model was created for a WW1 quarterly magazine. Unfortunately the project fell through and they didn't use this asset in the end.



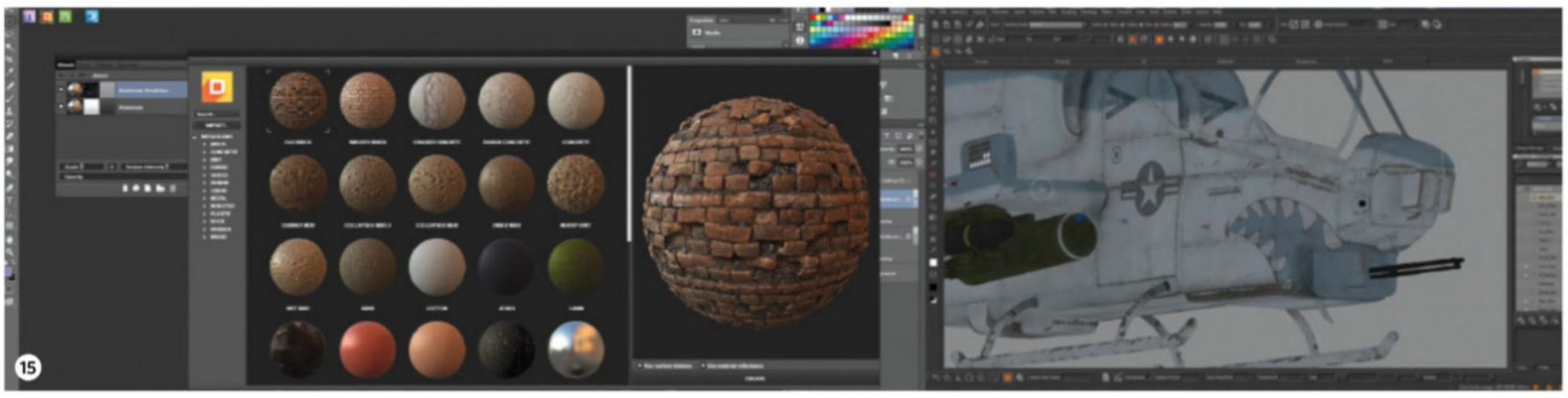
Add grime and dirt

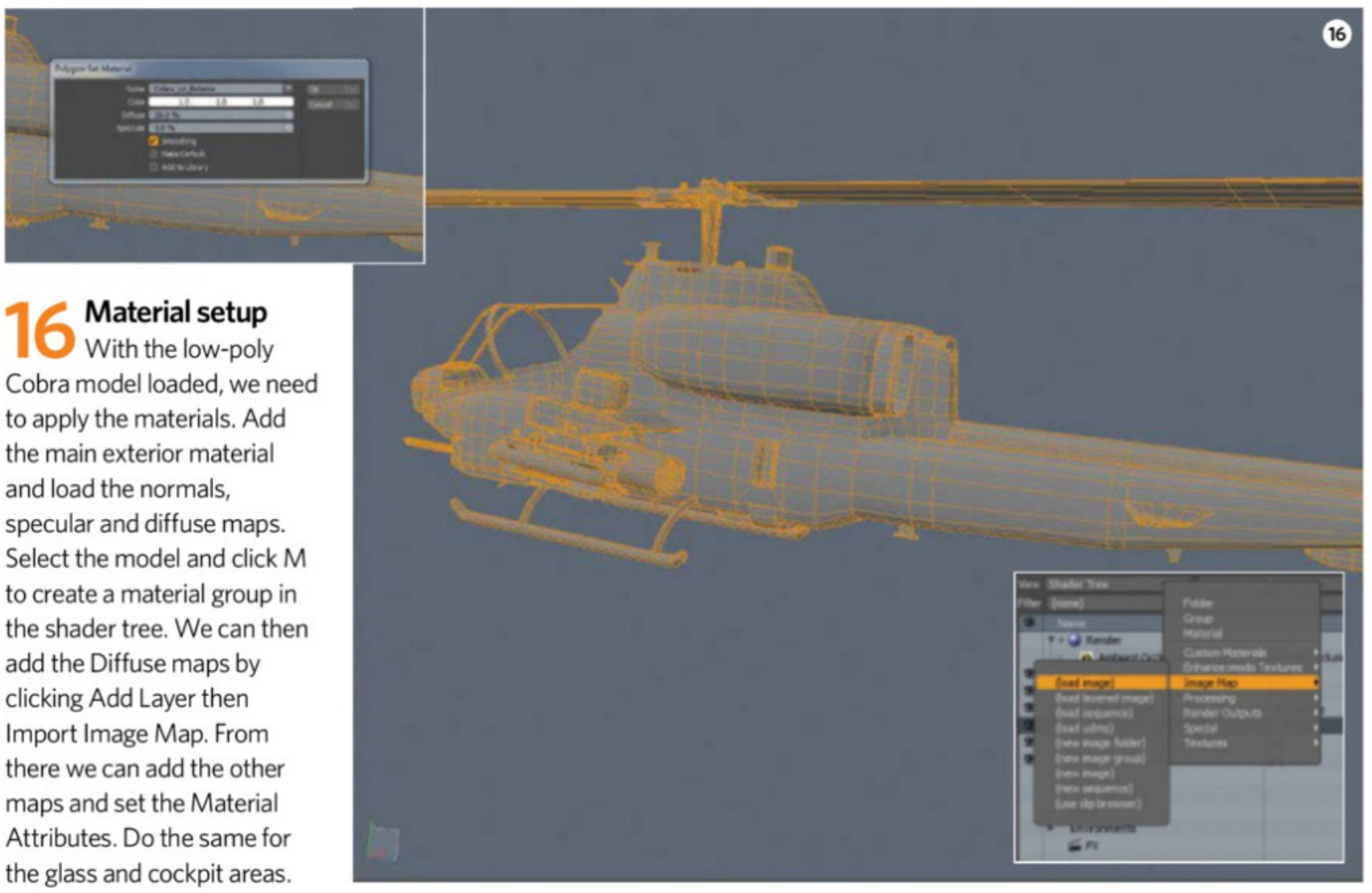
Bring the model to life and finalise your textures

14 Include dirt and grime The first thing we need to do is to get the base texture out of MARI and into Photoshop. You can do this by Ctrl/right-clicking the channel and scrolling down to the Export Flattened option. Click Export Current Channel Flattened and save it as a PSD file. Open the Quixel SUITE and load up the mesh and the Normal map in appropriate slots. Click Create Base and wait for a few seconds. You can then add a Smart Material. The preset dialog will come up and you can select whichever material you would like to use. From there, you can add another material from the Mega Scans presets. You can also adjust the texture and view it in real-time, powered by Marmoset, by clicking the 3DO button. After we've achieved the effect we're after, all we have to do to get the particular layers out of Photoshop is to click the layer and save as JPEG. In my project I imported five different layers from the dirt, grime and metal effects and then imported them into MARI using the Import Into Layer option.



15 Add final details Adding extra details to your model is very simple in MARI. Use the Paint Through tool within MARI and the Multiply Blending mode on the layer. You can use any markings from custom-made decals or even pictures found online. From here, export the textures back to MODO by selecting the Diffuse channel. Ctrl/right-click the channel and scroll down to Export Flattened, then click Export Current Channel Flattened. From there you just add the path and click Export All Patches. Do this for the Normals and Spec channels and then jump back into MODO.





16 Material setup With the low-poly Cobra model loaded, we need to apply the materials. Add the main exterior material and load the normals, specular and diffuse maps. Select the model and click M to create a material group in the shader tree. We can then add the Diffuse maps by clicking Add Layer then Import Image Map. From there we can add the other maps and set the Material Attributes. Do the same for the glass and cockpit areas.

See textures in real-time with MARI

With the newly added BRDF shader and the HDRI lighting mode, we can view our textures in MARI 2.6 in a realistic environment. To do this all we have to do is go to the Shaders>New Shader. Select BRDF and input the Diffuse, Spec and Normal channels into the appropriate slots. From there, go over to the Lighting tab and click the Globe icon to add one of the presets. You can even add one of you own HDRI maps, if you prefer. Make sure all the other lights are turned off and then you're good to go. You can adjust the Rotation and Intensity, if you like.

17 Develop the scene For the cinematic scene, we wanted something dramatic. What we need to do for this is to add a copy of the Cobra – one would be in front and the other moving in the background, with both of them shooting missiles. Spend as much time as you need to arrange it as you like. Then, add an image for the backdrop and a HDRI map for the reflections and indirect illumination.

18 Add smoke in MODO Since we have missiles firing we should add some smoke. With MODO it's really easy to create these effects. Add a simple piece of geometry to the rear of each missile and create a particle simulation by clicking the Add Simulation button. Add a surface emitter and point it to the geometry we've added. Next, add a Volume Mask material and add a layer of clouds and set that to Volumetric Density to give the smoke a random look. Experiment with the settings until you're happy with the effect. Run the simulation and pick the frame with the smoke that works best for this composition.

19 Final render This step is by far the easiest part of the project thanks to MODO's Preview Render window. We can adjust the settings from the lighting to the materials very quickly with the updated version of the XSR render plug-in from Seth Richardson. Rendering settings are very straightforward and all we really have to do is set the Frame Size needed for our final composition.

20 Finalise the composition The final composition should be completed in MODO, with the smoke and Cobra rendered as separate elements. Add some heat effects, Levels adjustments, some extra depth and motion blur. You may find that you need to adjust the smoke to suit the final image.

• **DID YOU KNOW?** • All tutorial files can also be downloaded from: **www.3dartistonline.com/files**

Step by step

Easy-to-follow guides take you from concept to the final render

Artist info

Gleb Alexandrov

Personal portfolio site www.blender-game.com
Country Belarus
Software used Blender, Cycles
Expertise Gleb takes a generalist approach to 3D and is well-versed in Blender

Photoreal art in Blender

Brushes 2013

"Here we're going to look at how open source tools can be used to create true-to-life imagery, capable of fooling the eye"

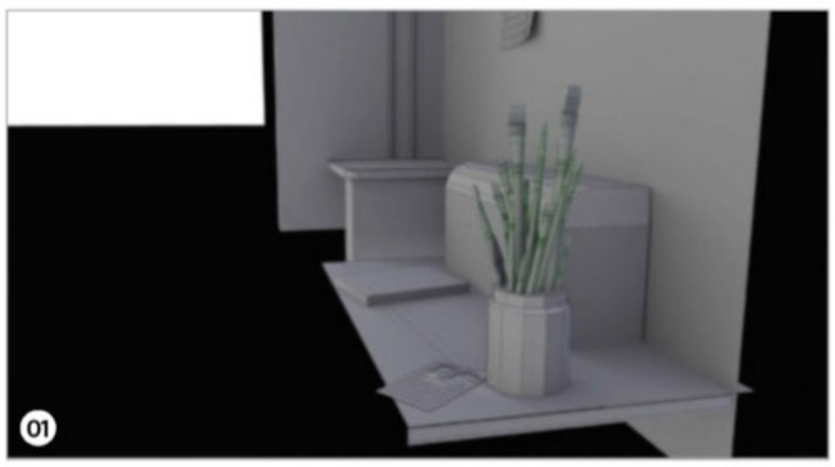
Gleb Alexandrov is a CG artist, indie game developer and Blender enthusiast

In this tutorial we're going to study the process of creating a photoreal interior scene in Blender. Going from modelling through to final render and post-processing, we will stop at each phase of the project and explore the interesting details. What role does a HDRI play in the lighting setup? What render layers do we need and how are we going to combine them in the Compositor? What textures do we need to make a complex material like paint over glass? The aim of this tutorial is to provide the answers to these kind of questions and more, based on a practical example of a fully accomplished scene rendered in Cycles. Follow along to create photoreal images in Blender!

Begin the modelling process

Block out the basic shapes and optimise the scene

01 Block out basic shapes Start modelling by blocking out the main shapes in your scene. At this stage basic low poly objects may be used, such as planes for the walls, boxes for the brush tips and a cylinder for the jar. To evaluate the result and make draft viewport previews, set up some simple lighting. The goal at this stage is to establish the object relationships in the scene and get an idea of the tonal values of the final render. It's always a good idea to get some kind of approximation of how the scene will look once you've illuminated it, before moving onto the more time intensive processes like detailing.



02 Start modelling The wooden handles of the brushes are all similar in terms of modelling, though a few unique ferrules were made. A ring was pulled out of the cylinder and was flattened at the bottom using proportional editing. As for the jar, there are many approaches. We could start with a cylinder, go to front orthographic view and extrude the top face a few times, changing its scale, or we can loft it using curves or B-surfaces. For now, let's use the Screw modifier applied to a curve. We need to draw a silhouette of a jar in front projection, then add the Screw modifier (Angle 360, Z Axis, Steps 18, Render Steps 8). Finally, put a Solidify modifier on top of everything to add thickness to the model.

03 Optimise camera and workflow If the blocking stage came out well and camera angle isn't going to change, it's a good idea to constrain the whole modelling process to the visible part of the scene. In real-time graphics this operation is known as view frustum culling. Of course, we don't have to worry about frames per second when rendering offline, but we might have a limited amount of time to finish the scene. Don't hesitate to fake the environment with a spherical panorama to get ambient lighting and believable reflections. If you want to do some additional shots later on, such as close-ups, make sure you plan for them at this stage.

Viewport performance

When dealing with a large amount of polygons the scene will quickly become unresponsive. This is especially true when leaving the Subdivision Surface modifier on top of the stack. For some reason Subsurf ignores the VBO parameter. To override this behaviour, put a modifier like Simple Deform with Influence set to 0 after Subsurf. Another option to increase viewport performance is Double Sided Lighting. Switching it to Off on all objects provides a massive boost to viewport speed. Meanwhile, Solid mode is the fastest. Keeping things in layers and working on one group of objects at a time is also a good way to optimise performance.

Concept

The initial idea came from an aesthetic experience and wasn't preceded by a concept painting. There's a jar with brushes on my table – it's so routine and everyday that it's almost invisible. However, one day I noticed something unusual about it. At this time of year at about 11am, the Sun peeks through my window. One day the brushes were lit so brightly and looked so joyful that in that instant, the rather dirty jar became something worth rendering.

With the Disc

Tutorial files:

- Texture files
- Tutorial screenshots

Learn how to

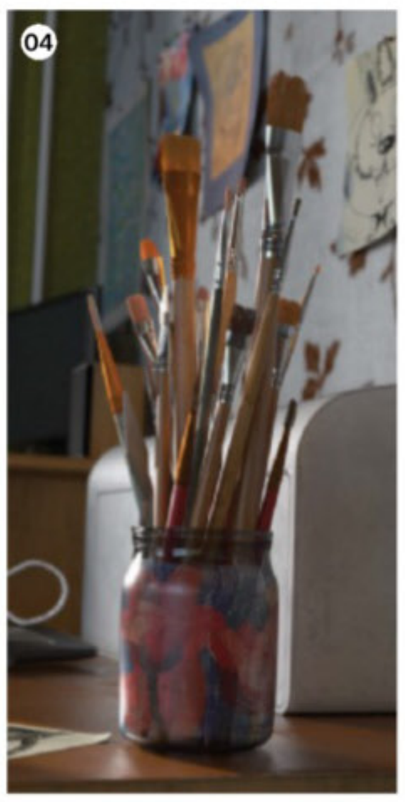
- ☑ Make complex mix materials in Cycles
- ☑ Set up hair simulation and use the hair shader
- ☑ Light the scene using HDRI, Sun and area lights
- ☑ Compose render layers and passes with Compositor

Materials and lighting

Achieve complex effects with shaders and light sources

04 Draft Materials For the first lighting, camera angle and object position tests in this project, simple materials were used. They consisted of just one seamless texture and were quite primitive in terms of shader complexity – mainly a simple mix between diffuse and glossy maps. However, sometimes a scene can be simple, but sometimes you'll feel the irresistible urge to add layers of complexity. As time passed, my desire grew to make every brush unique. I decided that every material had to be different and individual, which is a must when you're aiming for realism! So, while the backbone of the work was ready at this stage, the scene demanded ten times more work to bring it to where it needed to be.

05 UV co-ordinates and generated mapping I didn't plan to use UV maps as a guide to paint textures in the Image Editor – UV co-ordinates were primarily needed in order to achieve seamless textures. This meant any texture seams would be hidden out of camera sight. Along with UV co-ordinates for texture mapping, generated co-ordinates can also be used. Generated mapping means that the texture is placed procedurally, and not in accordance with UV co-ordinates. So, how can we control its placement? The Mapping node in the Material Editor and Rendered Viewport mode in Cycles solve this problem. By tweaking settings in the Mapping node, you can scale and position the texture and observe the results in real-time using the Rendered Viewport mode.

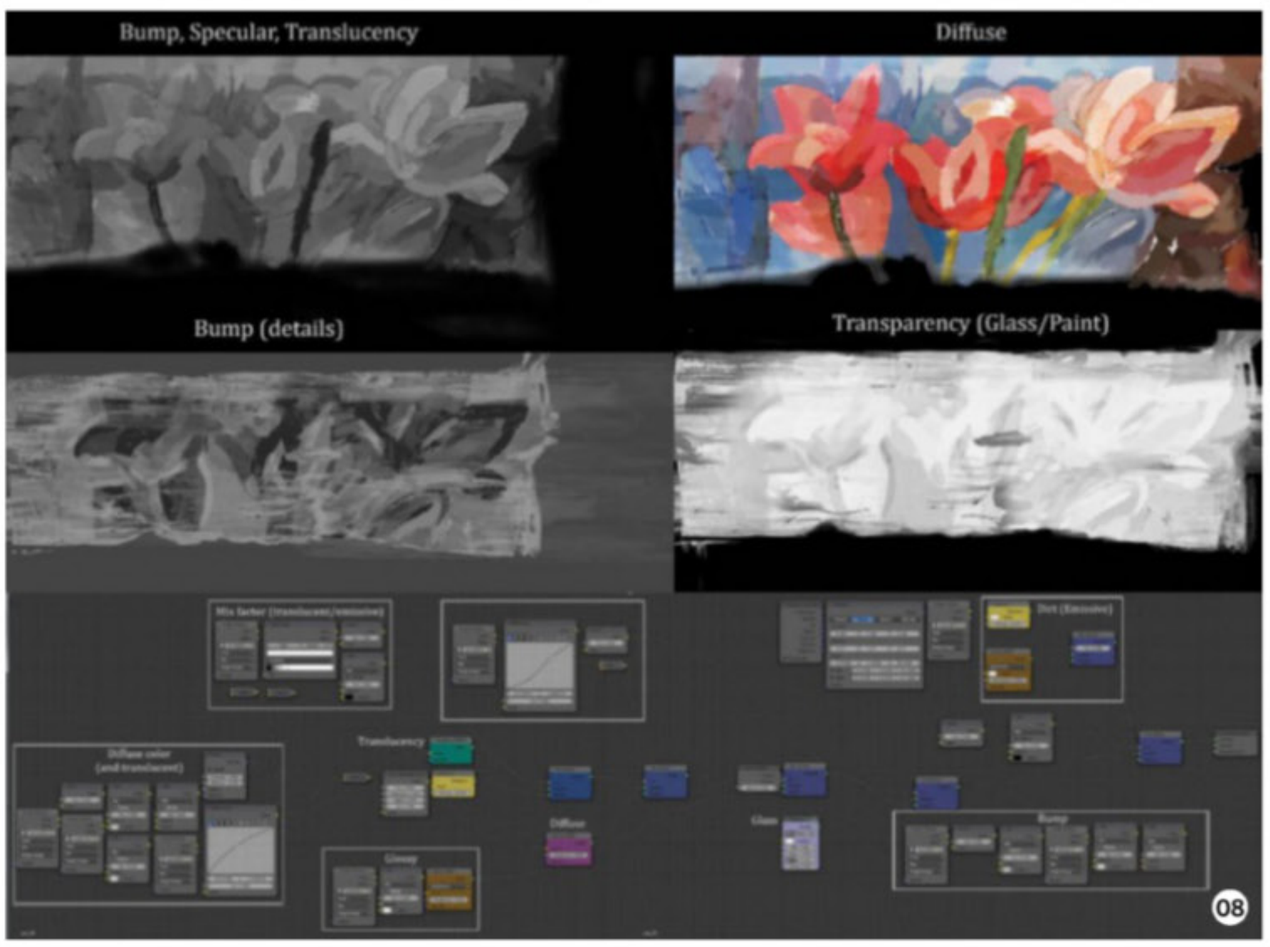


HDRI and sharp shadows

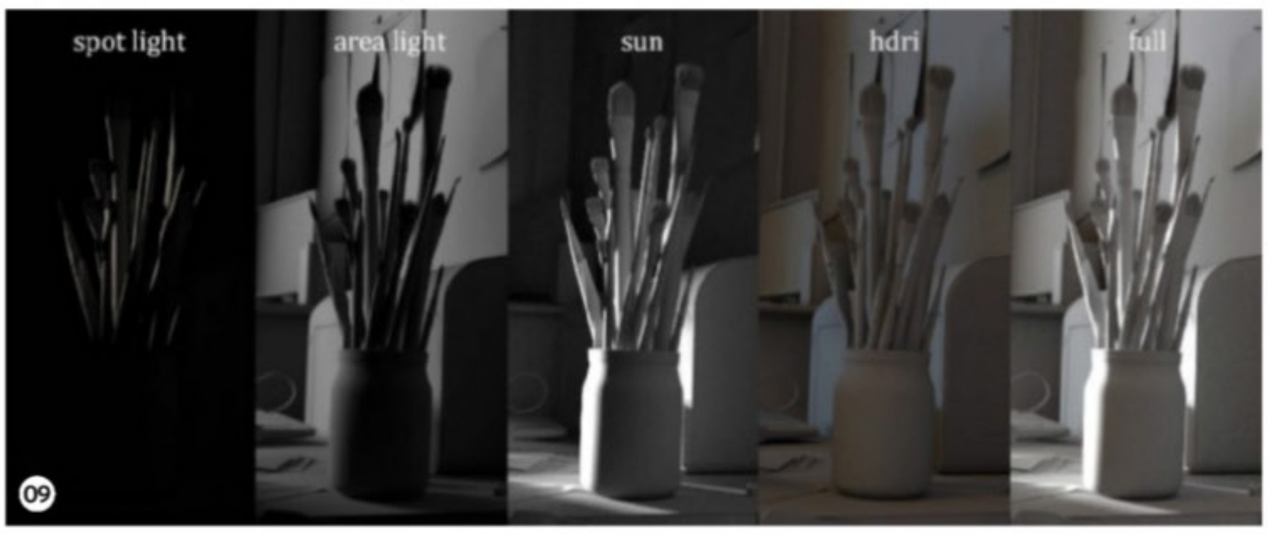
Sometimes we can sufficiently light the scene using only a HDRI in the environment slot. At first glance, HDRI environment lighting tends to be very soft and ambient. Indeed, a Sun lamp with a small size gives more accentuated shadows and details. Nevertheless, we can imitate this shadow sharpness with an HDRI with the help of the Math node. We need to multiply the Environment texture colour by a certain Value (try between 1.5 and 3) and plug it into the Background node's Strength input.

06 Blend Box mapping To project textures evenly and from several directions at once, you can switch Projection Method to Box. This type of mapping carries out the projection from several sides at once, diminishing texture distortion. Usually it creates a very solid illusion of even texture distribution across the object. Where projections meet, seams appear. Fortunately, these seams can be hidden with the help of the Blend parameter. This method is similar to unwrapping the model and choosing Cube Projection, but it also handles blending well.

07 Material structure Let's explore how our materials are structured. First of all, there is the Basic shader, which uses a neutral and seamless texture and UV co-ordinates. The second part of the material consists of supplementary shaders – in other words, a set of mix-shaders. As a blending factor for each of these mix-shaders, a seamless black and white texture, also known as a mask, was used. Usually, Procedural co-ordinates are used, either of Generated or Object type. There are about three additional shaders in every material, which consist of dirt, paint and scratches. For markings, text and images, additional UV maps should be used with the help of the Attributes node switched to UV map in the Material editor while using Vector output.



08 Add material to the jar The material of the jar can be broken down into two materials; the glass material and the paint material. Both of these materials have several composite materials. The glass material consists of a glass shader, but also dust, dirt and fingerprints sub-materials. In addition to this, the paint material consists of translucent, diffuse, reflective and emissive shaders. For this particular reason, it uses diffuse, bump and translucency textures. The transparency texture in the Paint Material determines what areas are translucent (in this case covered with a thin layer of the paint) and what areas are opaque (covered in a thicker, less transparent layer of paint). In this case, a displacement map will be used in the place of a normal map. With the issue you will find a variety of ready-made textures and maps that you can use for your scene.



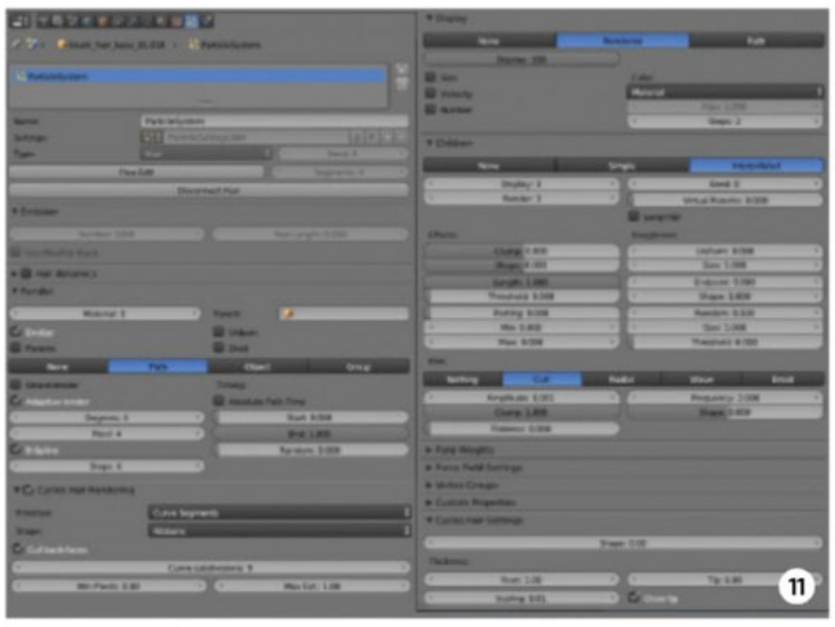
09 Set up the lighting For our key light source, use the Sun lamp. Shadows should be soft, so set them to around 12cm. As a supportive light source, place an Emissive plane at the window to give a soft light, then light the paintbrush tops separately with a Spot light. Unfortunately, Cycles doesn't have Directional light yet (Sun and Spot lamps are similar in function, but not quite the same) so we have to imitate it. For example, add Spot lights or invent obstacles between the object and the Sun to restrict its area of influence.

10 Add environmental light Spherical HDRIs softly illuminate the scene from all sides and create virtually no shadows, essentially producing a soft environmental light. What is very important about the HDRI is that the reflective parts of the brushes and the jar should reflect the particularly bright areas of the HDRI. These reflections accentuate the volume of objects and make materials act and appear as they would in the real world. Rotate the HDRI using the Mapping node to search for the most effective angle.

Hair simulation

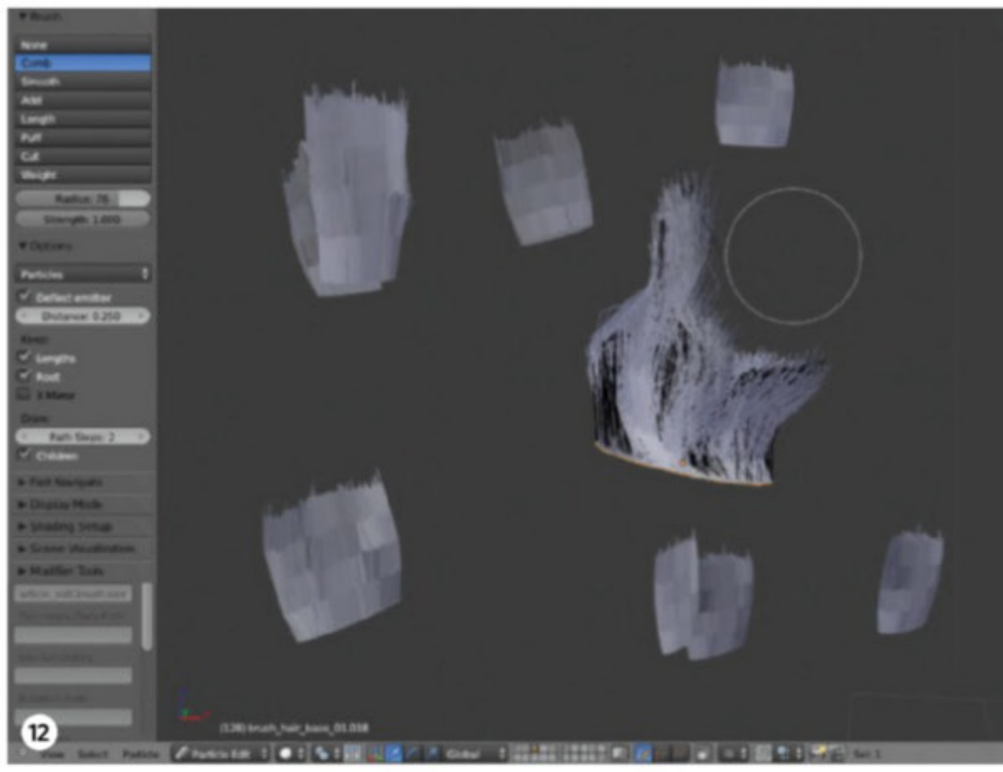
Simulate, style and shade the bristles

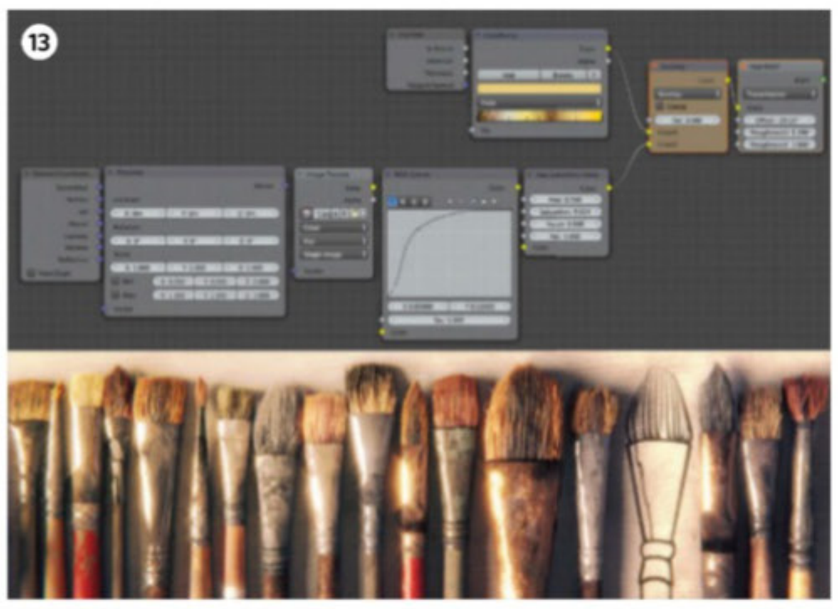
11 Particles system First of all, create a plane. On top of this plane should sit your particle system which will define the hair. Since the plane itself isn't visible, it isn't separated from the particle system. Set the Emitter Type to Hair, then adjust the hair's length and density. The hair's geometry will adapt to the resolution and depends on the minimal bending of the original geometry. These values will influence the polycount during the rendering, so it's important to remember this to squeeze the scene into the memory limit for fast GPU-rendering. With Cycles, set the Hair Rendering to Ribbon, and set Children to Interpolated. The Display and Render attributes should be set to between 2 and 5. The final values depend on your desired bristle density and computer capability, so you can experiment with them a little at this stage. While Children are activated, every Parent hair will spawn several Child hairs. The parameter called Uniform in Roughness controls how chaotic this hairs will appear, so set Kink to Curl mode.



12 Style the bristles Switch the viewport to Particle Edit mode and experiment, cutting and combing the hair. The Comb brush is useful for shaping the basic form of the hair. Be careful, however, because too much combing can separate the hair into clumps. Moreover, sharp angles between the hair segments may become evident if the hair volume is bent too much. Further shaping can be done with the Cut brush. It's necessary to add randomness to make the simulation believable and more realistic. Use the Length and Puff brushes for this. If you feel that you have overdone it, use Smooth brush to relax the hair strands, with the aim of making your bristles feel more realistic.

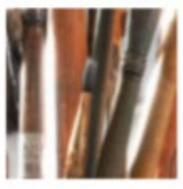
13 Use the new hair shader A new and improved hair shader was introduced in Blender 2.69, and in Transmission mode it looks very believable indeed. In my personal experience this shader can lead to longer renders times, but the results are of such quality that it's worth it. So, for the final composition in this instance I rendered the bristles separately using the new shader. The main difference between this shader and a regular diffuse one is the lighting. By tweaking the Offset value, we can also change the response to the lighting, creating a better overall effect.





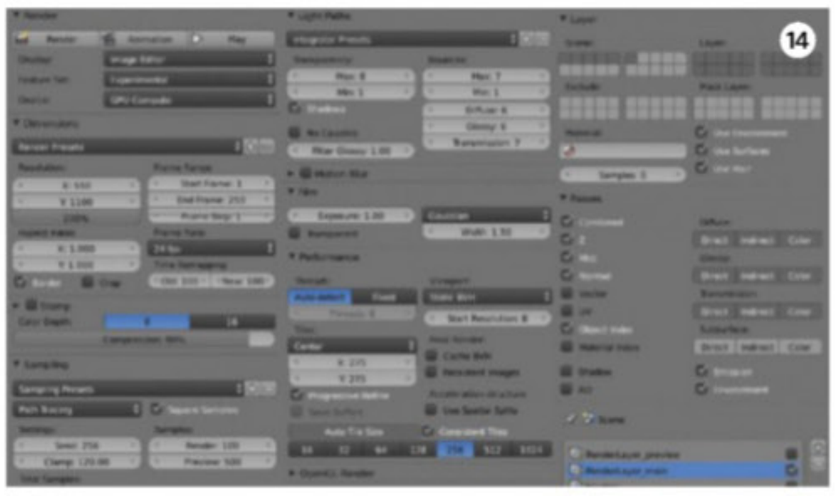
Edit the Hair Info node

The node called Hair Info in Material Editor is essential when texturing hair. Using the Intercept attribute and Color Ramp we can control the gradient of the hair colour from the roots to the tips. Note that the gradient may have several stops. Combining this information with the capabilities of UV co-ordinates we can confidently dye our hair using length (Intercept) and location relative to the particle emitter (UV).



Render the scene

Combine render layers and passes in the Compositor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15

Compositor pros & cons

As an alternative, all composing work can be moved to the Image Editor. On the one hand it's faster because Blender Compositor isn't fluent when updating the screen at larger resolutions. If your composite is heavy on nodes, it can sometimes take between 5 and 15 seconds to refresh the screen. On the other hand, Compositor is a fully integrated solution. Moreover, seeing an approximation on how the scene will look while you're doing draft renders is invaluable.

14 Render settings In order to achieve increased photorealism, leave the Caustics enabled and the maximum number of bounces at 8. When I originally rendered this image I used the classical Path Tracing and not the branched version. However, if I was working on this now, I would have done differently, since a branched Path Tracing coupled with manual tweaking of light source samples solves the problem of noise in the shadows. A spot lamp can generate lots of noise if there are a lot of obstacles between it and the camera.

Blender composition

Post-processing
17

15 Avoid mistakes When I created this, rendering was terribly slow. On my computer (i7 3690, 16GB RAM, NVIDIA 650M) it rendered for about two days in the resolution of 1100-2200 (12,000 samples). Some of the reasons for this include complex and sometimes badly planned materials; the bounces numbers being set too high; using a new shader for hair; bristle density; and classic path tracing in the interior scene with a lot of light bounces and reflections, and with a lot of objects between the Sun and the camera. My own situation was quite extreme, however, as I wanted to minimise the amount of post-processing as much as possible. I was lucky, in that the guys from Renegatt (GPUBOX software) helped me out by doing test renders and the final render. Thanks a lot!

16 Compose and post-process For compositing, use the Blender Compositor. For the jar, adjust the brightness and contrast, while a Material ID can serve as a mask. Intensify the sunlight on the table using a Diffuse Direct render pass, then adjust the brightness and contrast of the bristles. To add a sense of depth, use the Mist pass to add a bit of fog, then make the foreground brighter. Add glare in some areas, plus a slight amount of chromatic aberration to make the image seem more photoreal. To add to the realism of the scene, include dust particles. Finally, to give the image a photographic quality, add a vignette and adjust the curves and saturation.

17 Add final touches The last stage is to touch up the image in Photoshop. Usually this involves brightness tweaks and polishing the image. Colour grading is another thing that influences the overall picture. As we know, simply warming tones can lead to a completely different perception of an image. Another trick is to copy the image, blur it using Gaussian blur with a small Radius (between 4 and 7 pixels for 1920-1080 image) and then set it on top of original image using a Soft Light blending mode.

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Masterclass

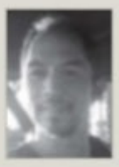
Eric Rosenthal is an FX artist and 3D generalist based in Los Angeles. He works on film, TV and commercials and teaches Maya part-time at FIDM

With the Disc

Tutorial files:
- Maya scene files
- NUKE composite
- Tutorial screenshots

Create a fire trail in Maya

"How can I make a *Back To The Future*-style fire trail emitted by a moving car?"



Creating an effect like fire trails is one of the many fun and rewarding things about working with computer graphics. It can be difficult, but once you have managed to solve a problem like this, it gives you another tool that you can save away into your bag of tricks.

To create this fire trail effect, we will start by emitting a trail of static particles from the tires of an animated vehicle. Next, we will use these particles to emit fluid into a container that simulates the fire. Emitting the fluid from particles gives us a good way to control the simulation. Maya has a preset fire effect that gives us a great starting point. We will add Turbulence Fields to give the fire some random motion and tweak the parameters of the fire to get it looking more realistic. We will then cache the fire effect so we can distribute the render or render only a specific frame range. Last of all, we'll render out the fire in separate passes so that it can be composited over the scene and the layers can be adjusted independently.

All of these steps will lead us to emitting a really successful, *Back To The Future*-style fire trail from a moving car.

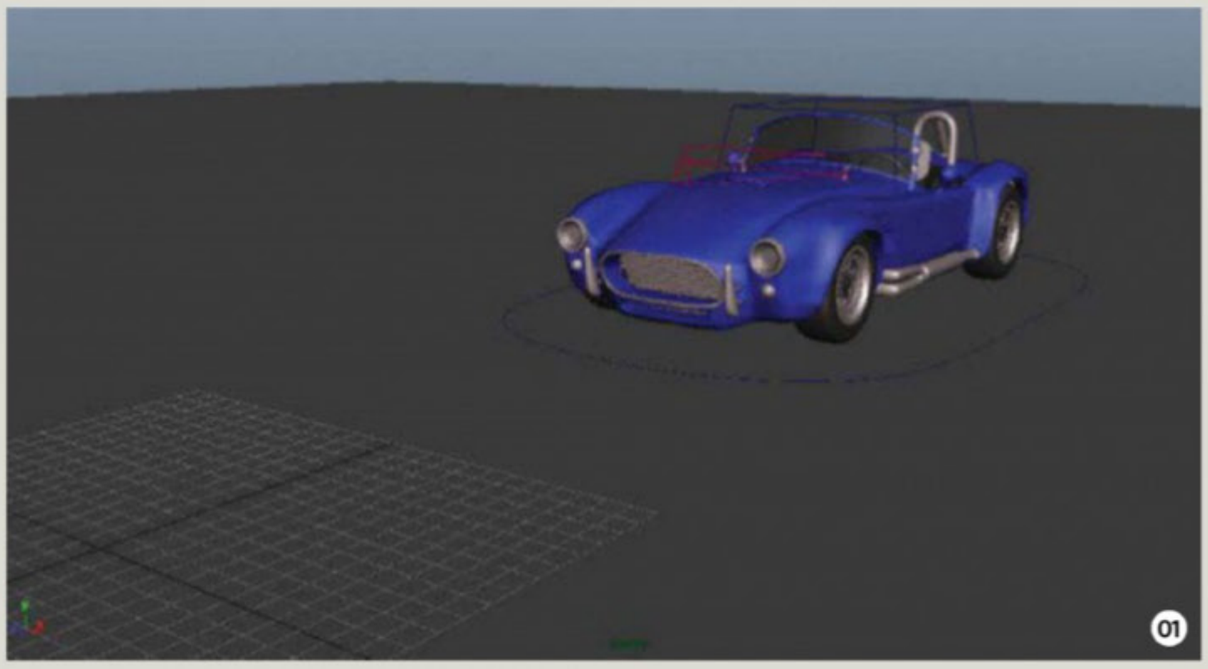
Set the wheels in motion

01 Set up the scene

Make sure the scale of your scene is reasonable. For my scene I'm using the default units, which are cm, but I'm treating them like feet. This makes my car 12 units long. In general, it's important to be aware of the scaling of your scene, as it matters for effects and lighting models. If your scale is very different you'll have to make changes to the fluid simulation. Before moving on, animate your car along a path.

02 Create the particle emission from the left tire

To create the particles, go to the Dynamics menu and go to Particles>Create Emitter. Under Basic Emitter Attributes, change the Emitter Type to Volume. Set the emitter scale to .2,1,1 to flatten it out. For the emitter, under Volume Speed Attributes make sure Away From Center and all other emission Speed attributes are set to 0, then move the emitter under your left tire and parent it to the car. Select the Particle object and under Render Attributes, change



01

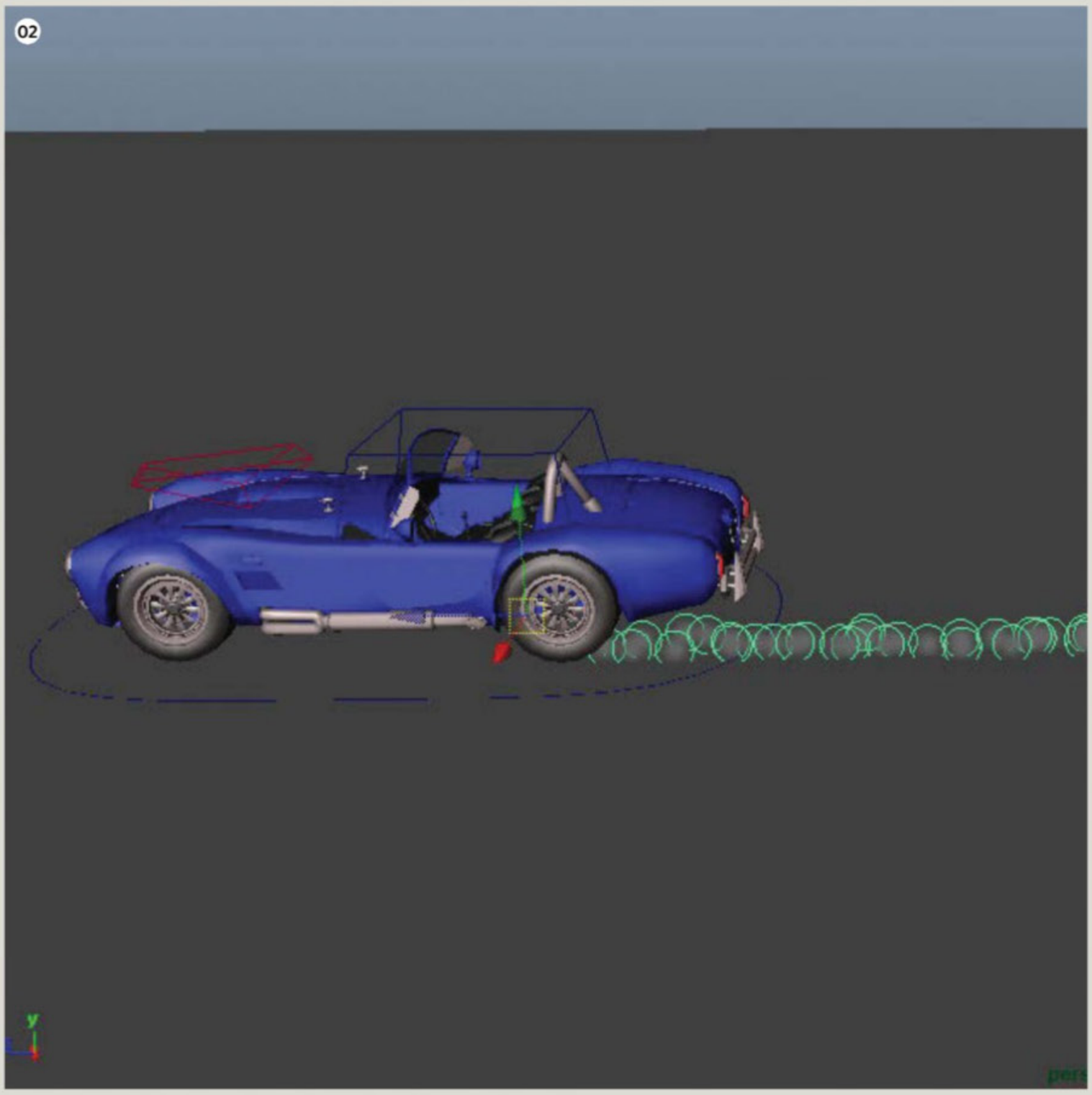
Particle Type to Cloud, so that you can see the particles better. Play back your scene and you should see something like that in the accompanying image. Adjust the Height of the emitter so the particles are resting on the ground instead of randomly.

03 Add particle emission to the right tire

We need to get the right tire emitting particles as well. Repeat the previous step to create the second emitter, which will be named emitter2. However, you have also just created a new particle object, particle2, and we want both emitters to emit the same particle object, particle1. To do this, delete particle2. To make emitter2 produce the same particles as emitter1, go to Windows>Relationships>Dynamic Relationship Editor. On the right-side of the window, select particle1, set Selection Mode to Emitters and highlight emitter2. Now both of the emitters should be emitting the same particles.

We want to add many more particles, so select emitter1 and emitter2 and set the Emission Rate to 500. You can set an expression so you only have to adjust emitter1, rather than both – just right-click on emitter2's Rate in the Attribute Editor, choose Create Expression and enter emitter2.rate = emitter1.rate, then press Create. This should dramatically increase the number of particles that are produced by both of the emitters.

02



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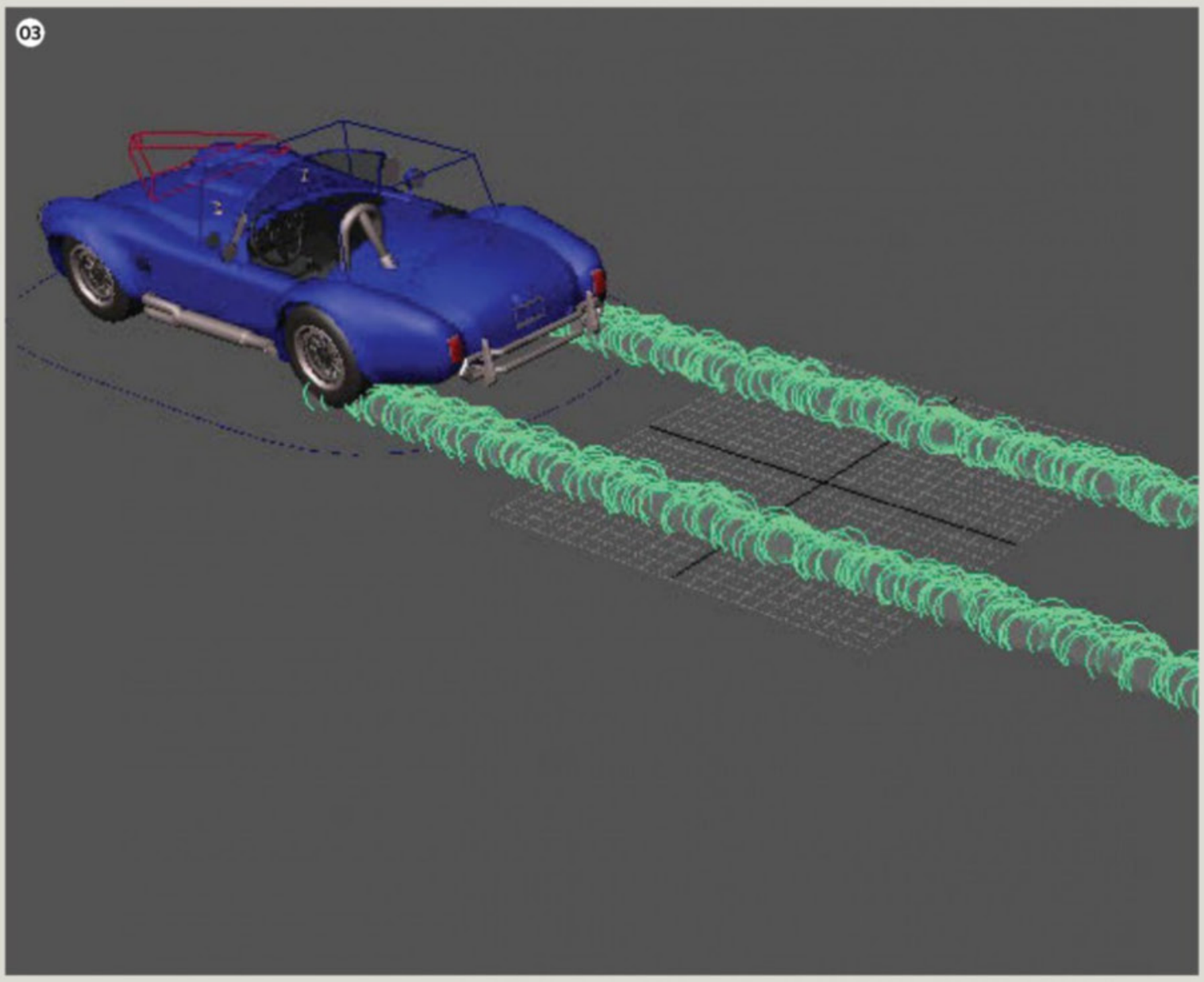
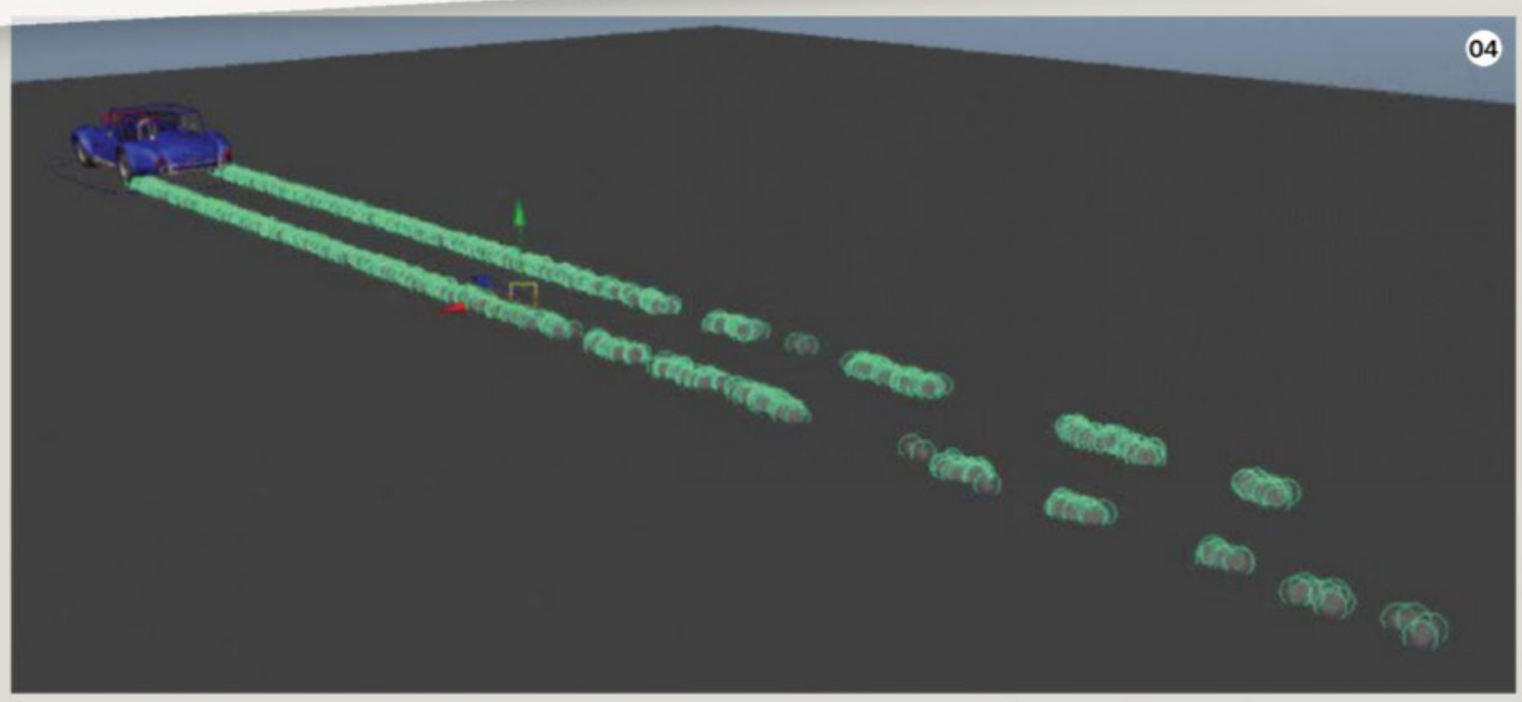
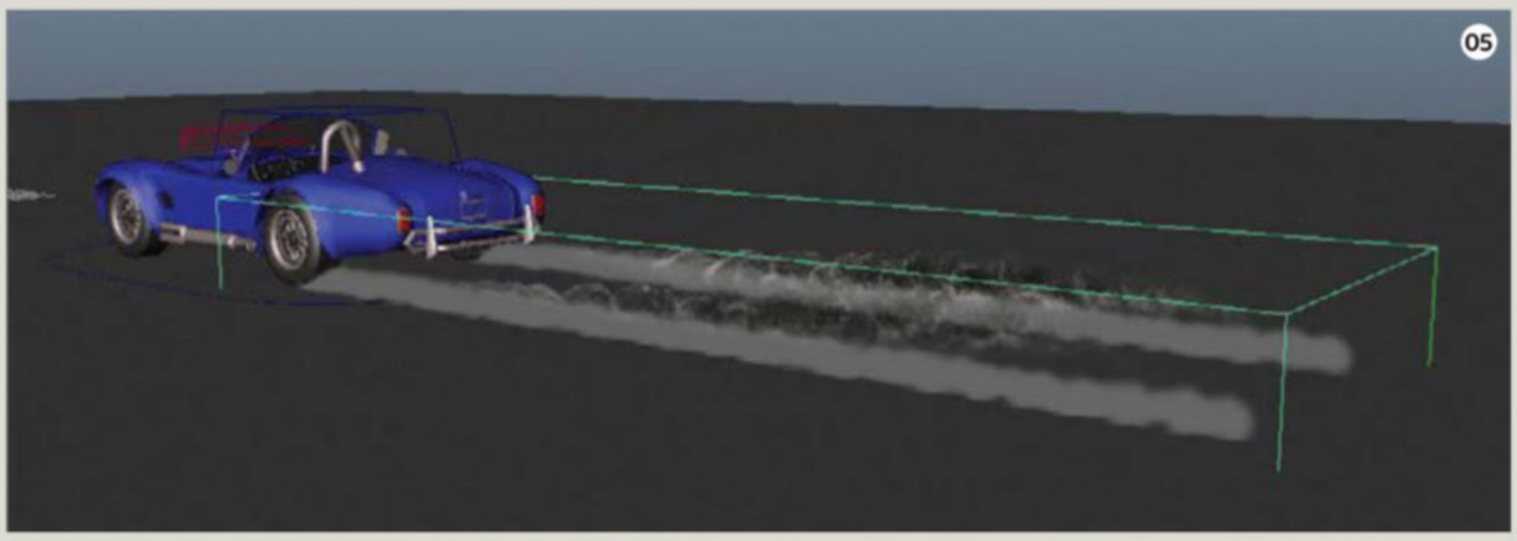
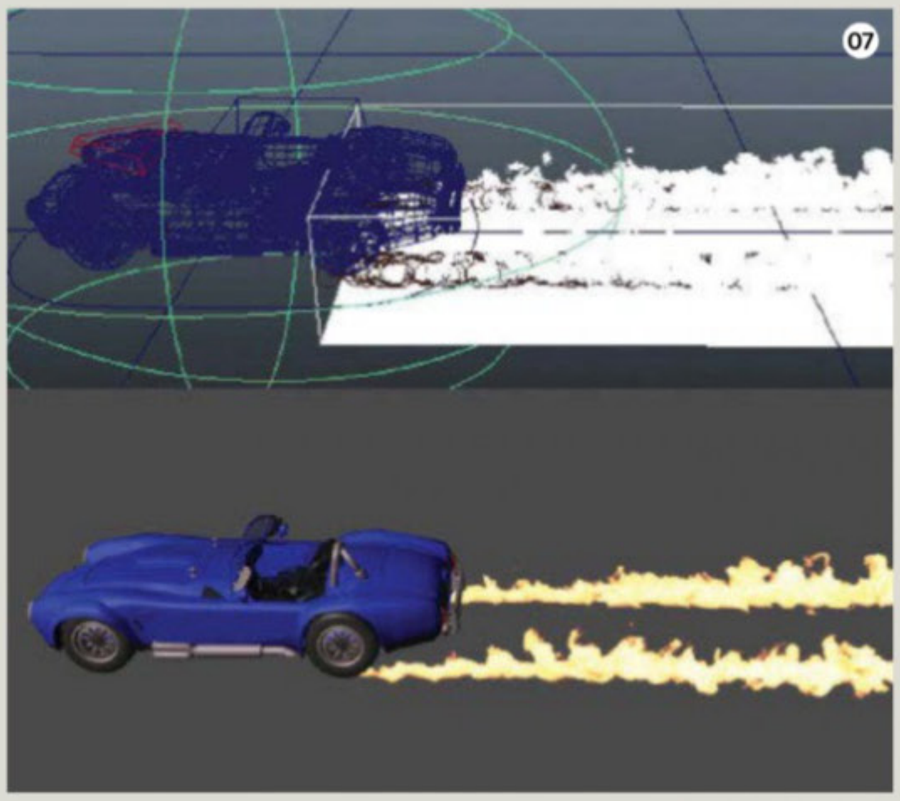


Know your tools

One of the most important things when working with CG is that you know and understand the tools you're using. This doesn't mean to need to know things like the Navier Stokes equation to use fluid dynamics, but a little technical knowledge and an understanding of maths and programming can go a long way. All too often, it can be tempting to flip a switch that you don't understand, hoping that it will create the right results. However, by not knowing what the process is for a particular function, you risk struggling to troubleshoot if you come across a particular problem. From my own experience, I have found that a reliable way to find out how a certain tool works is to create a simple test scene with that specific tool. For example, if I want to use final gathering, I will initially try it out on cubes and spheres until I've developed a certain level of understanding of how the tool works and how it will affect my actual scene. Once this understanding is pretty much concrete, I will apply it to my complex scene. I've always found this a good method of getting to grips with how specific tools function and their ultimate impact on the scene.







04 Adjust the particle emission

Now we'll set the lifespan of the particles. Next to lifespanPP, right-click and select Create Expression. Make sure Creation Expression is selected, then enter lifespanPP = rand(1,1.25) and press Create.

We want to add a cool trick to make their lifespan vary in patches. To do this, add this line to the creation expression for particle1: if (noise(particleShape1.position * .25) > 0) { particleShape1.lifespanPP += 1; }

The .25 noise scale determines the size of the patches, but feel free to experiment with different values.

05 Emit fire

Go to Window>General Editors>Visor and under the Fluid Examples tab under the Fire folder, you should see TurbulentFlame.ma. Right-click on it to import it. Select the fire, and under FlameShape, turn Auto Resize on. In Auto Resize options, set the Auto Resize margin to 1 and uncheck Resize Closed Boundaries. Under Container Properties set Boundary X and Boundary Z to 0. Move the fluid container so the bottom of the container is at the ground level. Delete the emitting torus and the camera that was created along with the flame as we don't need them. Select the fluid container and Shift-select the particle object and choose Fluid Effects>Add/Edit Contents>Emit From Object.

06 Edit the fire settings

In FlameShape do the following:

1) Set the Base Resolution to 10 to speed up playback, then under Shading, set the Edge Dropoff to 0, because with Auto Resize on we generally don't want any drop-off.

2) Under Shading>Incandescence, select the whitish colour, then open the colour picker. Change the Value of the colour from 20 to 5, but feel free to adjust this later.

3) Under Dynamic Simulation, change Substeps to 2 and Simulation Rate Scale to 4. This increases the quality of the simulation and speeds it up. In Fluid Emitter 1 under Basic Emitter Attributes, set the rate to 25%. Hide the particles by opening up Render Stats and unchecking everything, then play it back and render using mental ray. If it looks good, change the Base Resolution of FlameShape back up to 30, play back and rerender.

07 Add Turbulence Fields to the fire

Now refine the fire using Turbulence Fields so it moves in a more chaotic manner. When you are testing the simulation it is helpful to temporarily lower your Fluid Resolution to speed up the interaction. First, add an overall Turbulence to the scene. Select FlameShape and from the menu, select Fields>Turbulence. In turbulenceField1, set Attenuation to 1, Frequency to .5, and Noise Level to 2.

Next, add a stronger Turbulence Field localised to the car to simulate the wake created by the car displacing air around it. In turbulenceField2, set the exact same settings as turbulence1, but additionally, set Magnitude to 100 and under Volume Control Attributes set Volume Shape to Sphere. Scale turbulencefield2 so it is about twice the size of the car, then parent it to the car. The change is quite subtle, but when you play back your scene you can see the fluid near the car moving more wildly and then calming down when it is outside the second Turbulence Field.

If you want to be fancy you can keyframe the magnitude of turbulencefield2 so the faster the car moves the higher the magnitude. However, avoid getting *too* fancy – it's generally better to keep your simulation as simple as possible. The image for this step shows the position of the Turbulence Field attached to the car (top) and the rendered fire (bottom).

08 Cache the fluid

When we're satisfied with the behaviour of the fire, it's time to create a cache of the fluid. Make sure the Fluid Resolution is correct and your Time slider is at the range

of frames you want to cache. Select Fluid nCache>Create New Cache, then cross your fingers. To speed up caching, set the active viewport to Wireframe mode so Maya doesn't waste time redrawing.

09 Set up the render layers

Now we'll separate our scene into render layers to give us maximum flexibility in the compositing phase.

Create a ground plane and environment sphere, with separate render layers for the background, the car and the car's shadow. Create the four render layers for the fire:
1) Fire: Select FlameShape and, in the Render Layers window, choose Layers>Create Layer From Selected.
2) Fire lighting ground: Select FlameShape and the ground plane and choose Layers>Create Layer From Selected. Make the render layer you created active and in FlameShape, turn off Primary Visibility. In the Render Settings under Indirect Lighting, create a Layer Override for final gathering and turn it on. Do a test render and you'll see the fire lighting the ground plane.
3) Fire lighting car: Select FlameShape and the car and choose Layers>Create Layer From Selected. Like the previous step, make the render layer you created active and in FlameShape, turn off Primary Visibility. In the Render Settings under Indirect Lighting, create a Layer Override for final gathering and turn it on. You may also want to crank up the Primary Diffuse scale for the final gathering to 3 or 4, then assign a default Lambert shader to the car.
4) Fire reflected in car: Select FlameShape and the car and choose Layers>Create Layer from Selected. Make the render layer you created active, turn off Primary Visibility and turn on Visible in Reflections. Create a Blinn shader with the Reflectivity, Specular Rolloff and Specular Color set to 1 and assign it to the car.

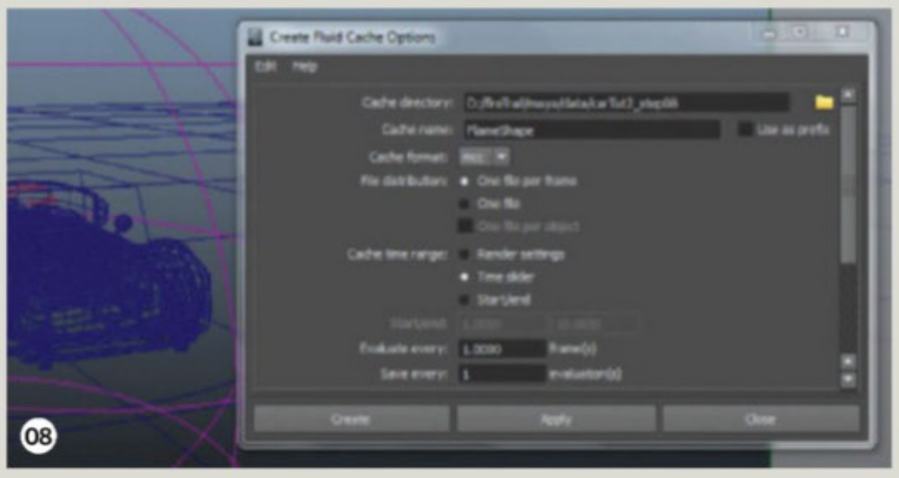
10 Render the layers

Set the Render Settings in Maya (Window>Rendering Editors>Render Settings). When rendering layers, set the file name to something like <Scene>_<RenderLayer>/<Scene>_<RenderLayer>. This lets Maya organise your layers and file names automatically. Set the frame/animation extension to name.#.ext and the Frame Padding to 4. Make sure to set your renderable camera and Frame Range.

11 Composite the images

When rendering is done, import the images into a compositing package and start layering! Rendering out the fire elements separately gives us a lot of flexibility in the compositing stage as we can use blurs and colour adjustments to fine-tune our image. Screening the glows and reflection over the car and ground works well because it brightens the image without blowing it out.

This tutorial is a good starting point, but feel free to experiment with your own with different settings. Even after the fluid is cached, you can tweak the shading and modify things such as the colour and opacity. You can also increase the resolution for more detail, but you'll pay the price with higher render times.



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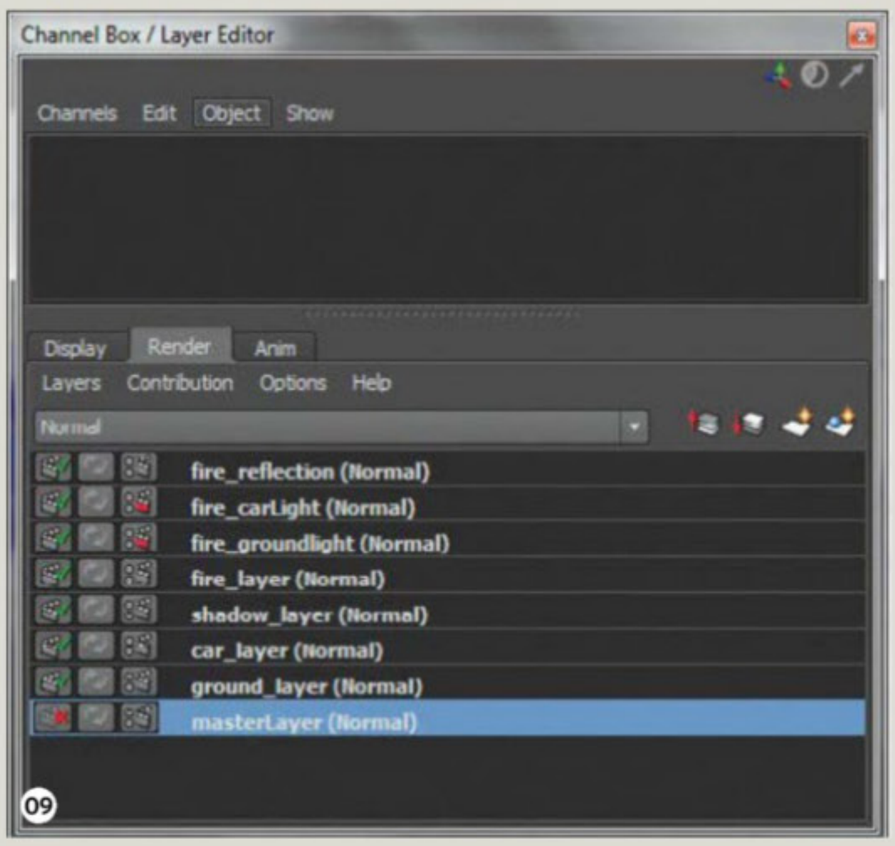

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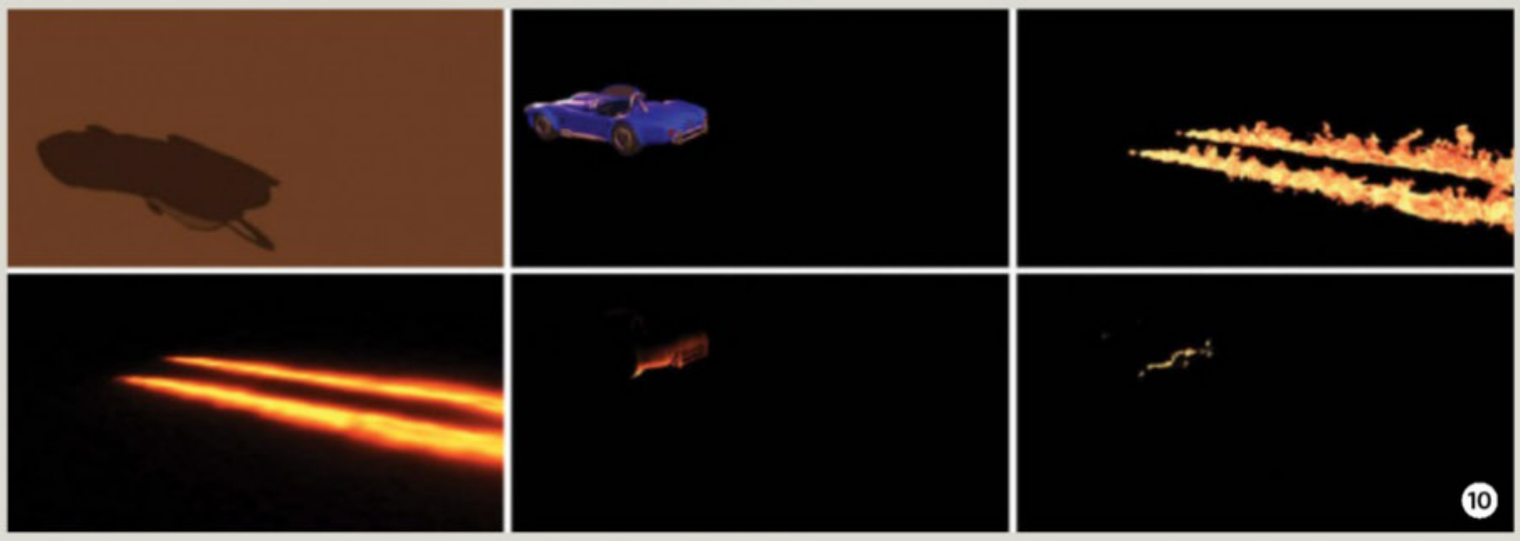
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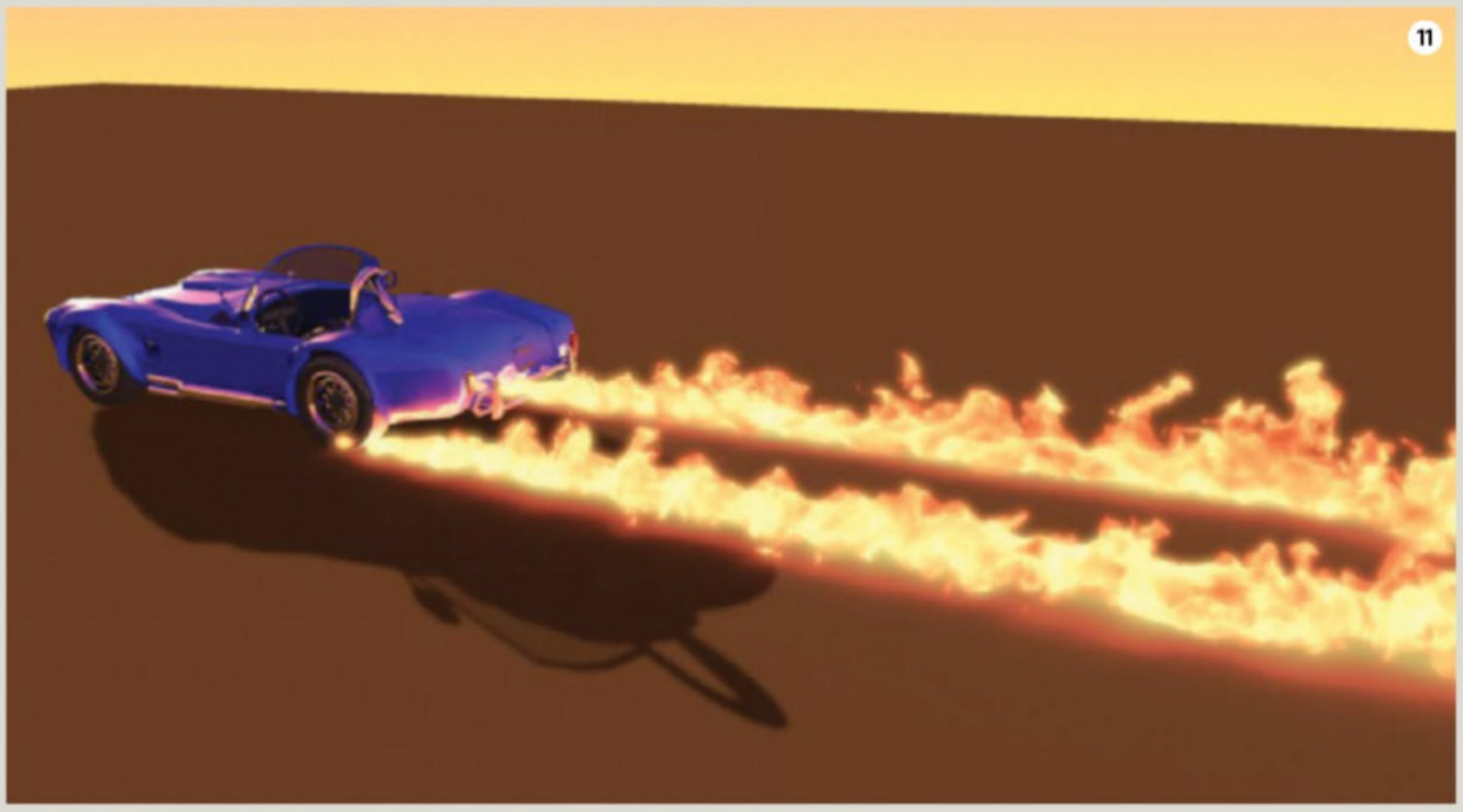
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Problem solving

A big part of effects work is problem solving; you are given a problem and have to find a reasonable solution in an all too limited amount of time. Be flexible and consider all approaches to the problem, rather than just picking the one that seems easiest to implement. For example, in this project I considered emitting the fire from an animated texture, and even using some sort of sprite based approach. Bouncing problems off co-workers can help. You may run into a wall with one approach and have to switch over to another one, or may find a solution that is a combination of multiple approaches. Be persistent, but also flexible!

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Back to basics

Continuing on from last month, Jahirul Amin covers the process of texturing and shading a cuttlefish

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Tutorial files:
- Scene files
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The cuttlefish, complete with final textures and shaders

INSERT THE DISC for in-depth video tutorial

Texture a cuttlefish in Mudbox and Maya

"Following on from last issue's tutorial, we will learn how to UV unwrap our cuttlefish, create and apply maps and textures in Mudbox and add shaders in Maya"

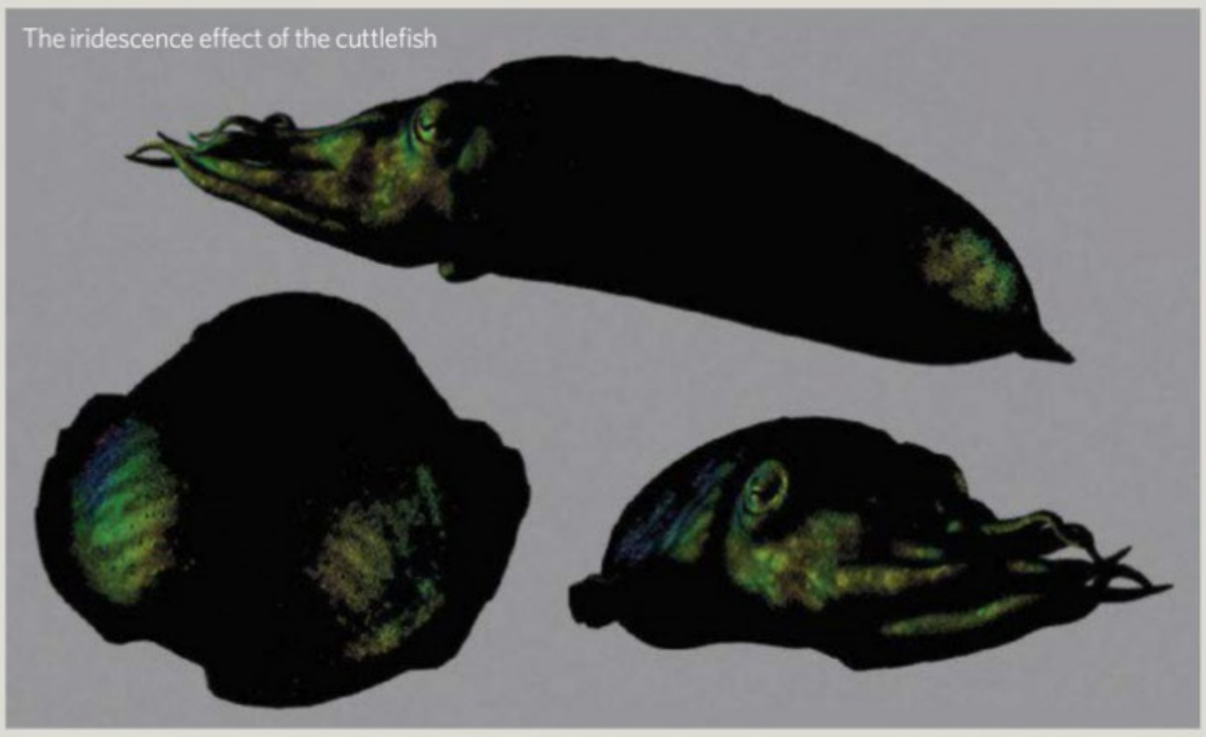
In this tutorial we will continue working on our cuttlefish by adding the textures and the shaders. If you didn't follow the last tutorial, you will find all necessary assets with the disc. Before starting the process of texturing, we are going to have to UV unwrap the geometry. It isn't the most exciting task, but it needs doing! To speed up the process of unwrapping the suckers, we'll take advantage of a fantastic script called aj_UVTransfer.MEL script by Syed Ali Asad Jafri. This will enable us to copy the UVs from one object to multiple others. From this, we will create Displacement and Normal maps, followed by Diffuse, Epidermal, Subdermal and Specular maps. Once all the maps have been created, we will create our shaders and test them out in a look-dev environment that has already been set up.

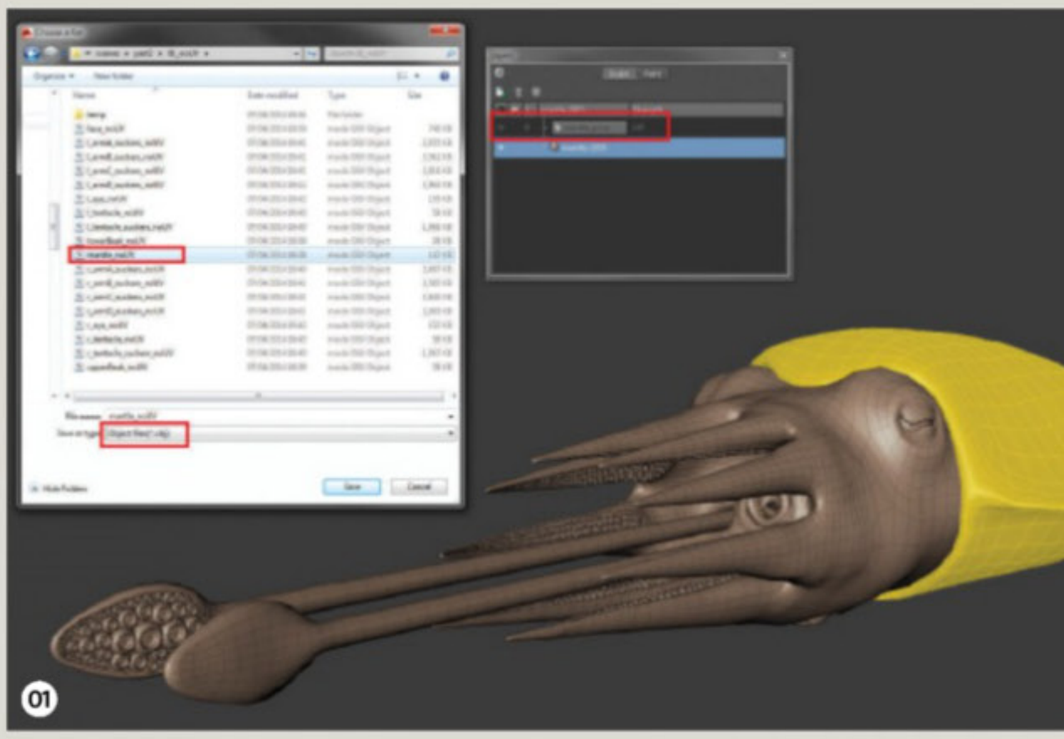
Before we begin, I just want to give a big thank you to Andreas Reimer from HDRI Hub (www.hdri-hub.com), who has kindly allowed me to give away some HDRIs for use in this tutorial.

As you'll see, there are a good few more steps here than you'll be used to, which is why I'm keeping this introduction short. I would, however, suggest that you spend a bit of time beforehand researching the different textures and colours that a cuttlefish can have and pick a look that you'd like to work with.

The cuttlefish shown under various lighting conditions

The iridescence effect of the cuttlefish





Let's get our toes wet...

01 Export OBJs for UV unwrapping

Open up start.MUD and you'll notice that since last time, I have flattened all the sculpt layers down (other than the pose layer) to make things a little more sprightly. In the Object List tab, select all the meshes and hit the Page Down key on the keyboard or go Mesh>Step Level Down and drop down to the lowest subdivision for each mesh. Now make sure the pose layer is disabled and one by one, export out each mesh as an OBJ file. Name the OBJs accordingly and add a suffix of _noUV to each file.

02 Unwrap UVs in Layout

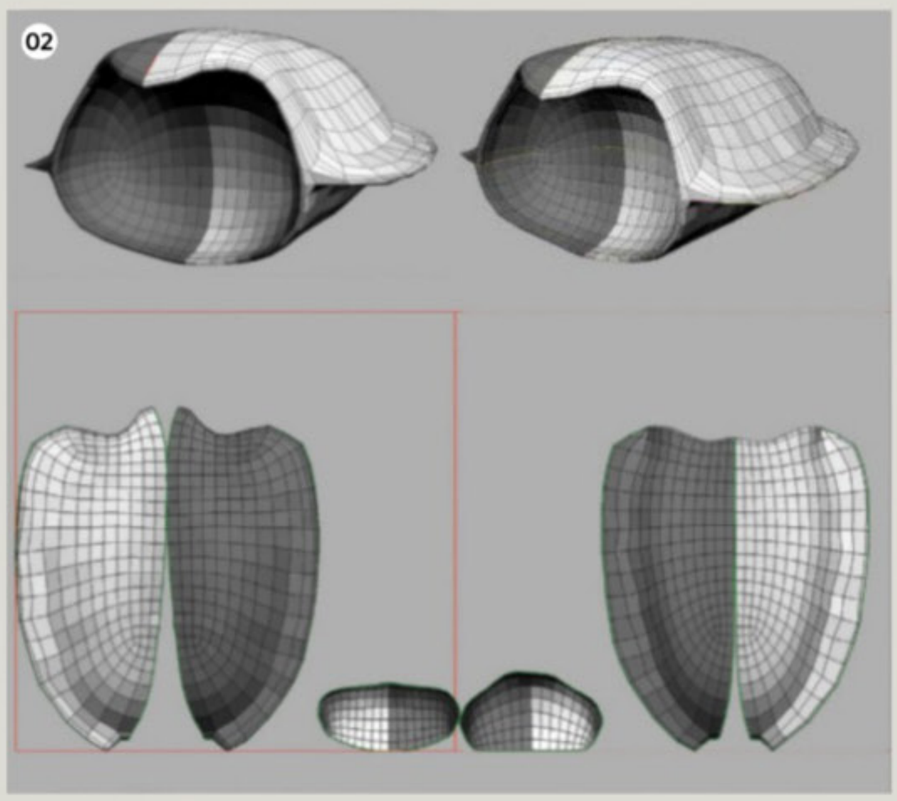
Start by importing the mantle_noUV.OBJ into UV Layout and in the Edit tab hit the Find button that sits next to Symmetry. Now, select any edge running down the centre of the mesh and hit the Space bar. Next, move the cursor over an edge and press the C key to add cut lines throughout the model. Once you're happy with the placement of the cut lines, hover over the highlighted edges and press Enter to split the mesh. Then hit the D key over the mesh to drop the shells to the UV View.

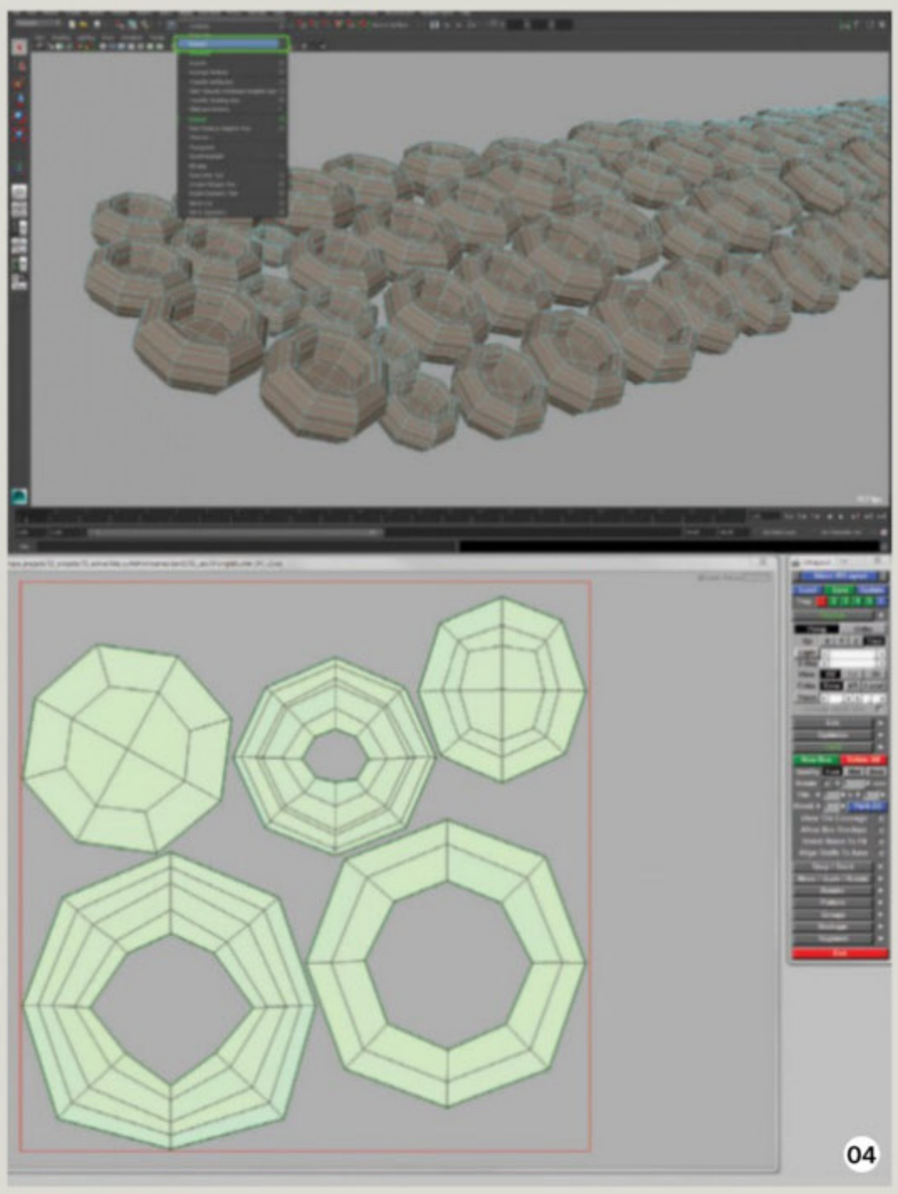
03 Continue unwrapping

Switch to the UV view to edit the shells. To flatten out the UVs, hover the mouse over one of the UV shells and hold down the F key. If this does not give you the most desirable results, you can use Shift+F to bloat the UV shell and then flatten it. This should get you most of the way, but you will most probably need to go in and do some manual tweaking. I use a combination of Shift+MMB, Cmd/Ctrl+MMB and Cmd/Ctrl+Shift+MMB to refine the UVs. What you should aim for is that the UV shells are mostly green. Anything red will indicate stretched UVs and anything blue indicates compressed UVs. Once you're happy with one half of a shell, press S to mirror it over to the other side. As the model is not truly symmetrical, you may find that you need to disable symmetry while tweaking. Once happy with the UVs, lay out the UV shells using the Pack tools. On occasion, I will sometimes rearrange the placement of the shells in Maya to find a better layout. Save each mesh as an OBJ file, naming them accordingly and adding a suffix of _yesUV to each file.

04 UV unwrap the suckers

For the suckers on the cuttlefish tentacles, I approached things slightly differently. First, import a set of suckers into Maya (I picked l_armD_suckers_noUV.OBJ). Then go into Face mode and highlight all the faces of every sucker. With those faces selected, go to Mesh>Extract to separate each sucker. We will then import a single sucker to UV Layout to be unwrapped. Once unwrapped, send the UV unwrapped sucker back to Maya so we can transfer the UVs to all of the other suckers in the next step.





Back to basics

05 Keep unwrapping the suckers and organise UVs

To transfer the UVs from our sucker to all other suckers, use the aj_UVTransfer.MEL script. Open up the script in the Script Editor (you'll find it in the Scripts folder in the project_cuttlefish directory), highlight aj_UVTransfer within the script and execute it by pressing Ctrl+E. A GUI should pop up for the tool. Select the UV unwrapped sucker and hit the Add Source Objects button. Then select all the other suckers and hit the Add Target Objects button. Set the Transfer Mode to Transfer One to All and hit Apply. Now with all the suckers selected, open up the UV Texture Editor and go Polygons>Layout. Select all the suckers and go to Mesh>Combine to create a single mesh. Rename this accordingly and go Edit>Delete By Type>History to keep things clean. Once all the different parts of the cuttlefish have been unwrapped, take time to organise the placement of the UVs. I shared some of the UV space between multiple objects, so all the suckers from the left-hand side share one UV tile and the same goes for the right-hand side.

06 Import UVs into Mudbox

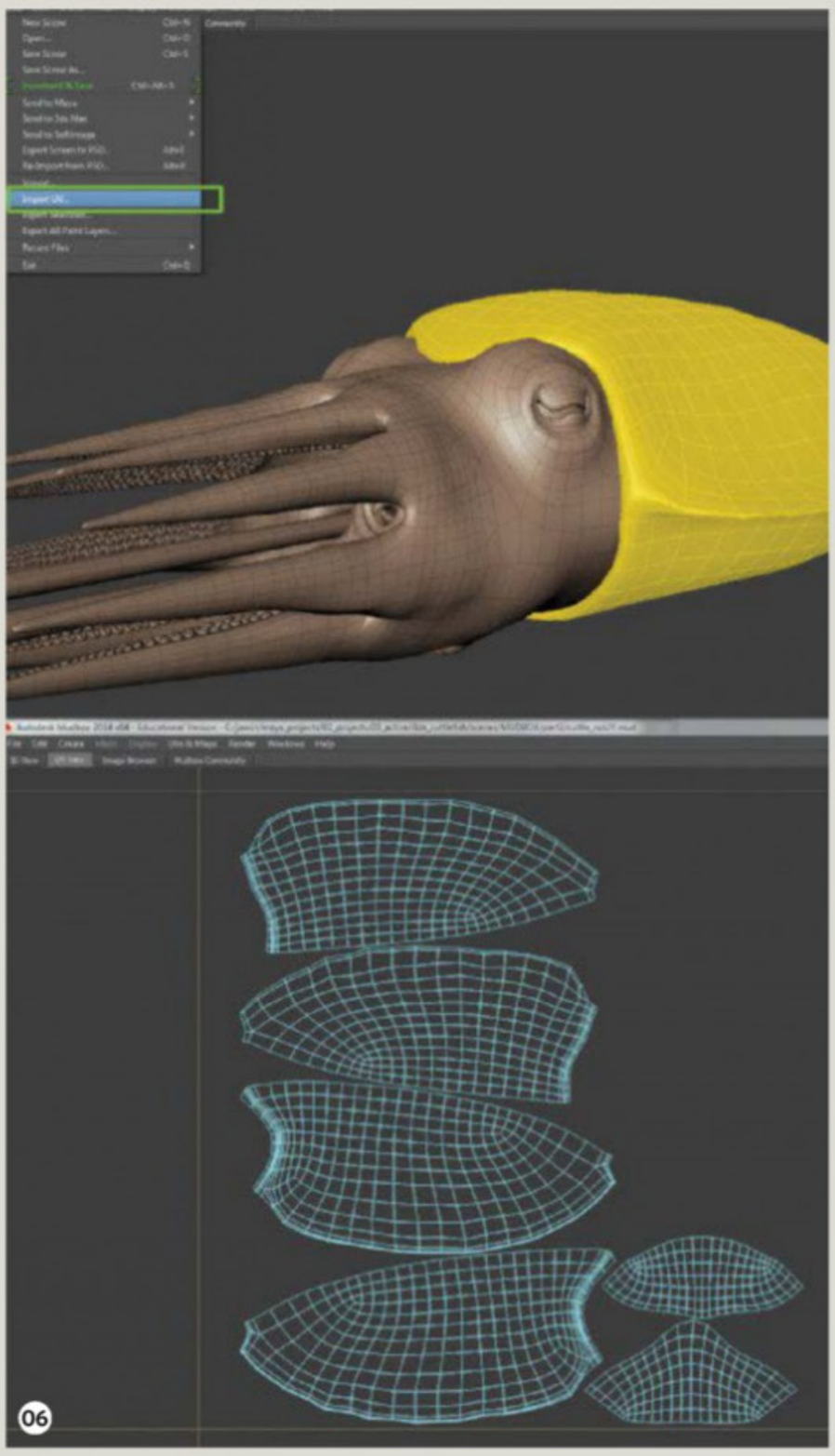
We need to update the meshes in Mudbox with the new UVs. To do this, select a mesh (the mantle, for example) and then go File>Import UV. Select mantle_yesUV.OBJ and when the Import Options window pops up, leave everything as it is and hit OK. Pop into the UV View and you should see the UVs have successfully transferred over. Repeat the process for all the other parts of the cuttlefish. As the UVs share the same UV tile, we need to give each object its own material so we can paint our textures without any problems. To do this, simply select a mesh, hold down the RMB and go Assign New Material>Mudbox Material. Repeat this for each all the meshes and in the interest of cosmic harmony, make sure to name everything as you go.

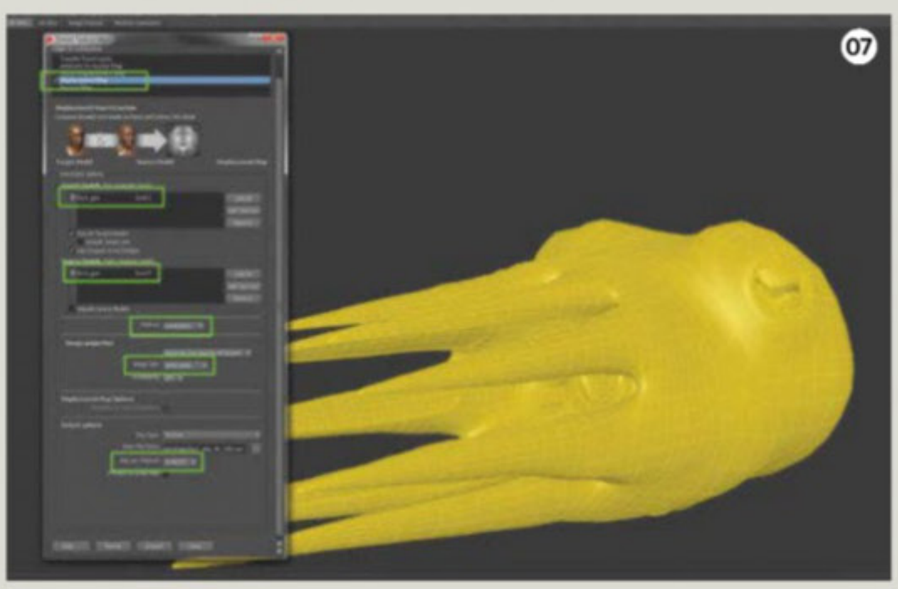
07 Add Displacement maps

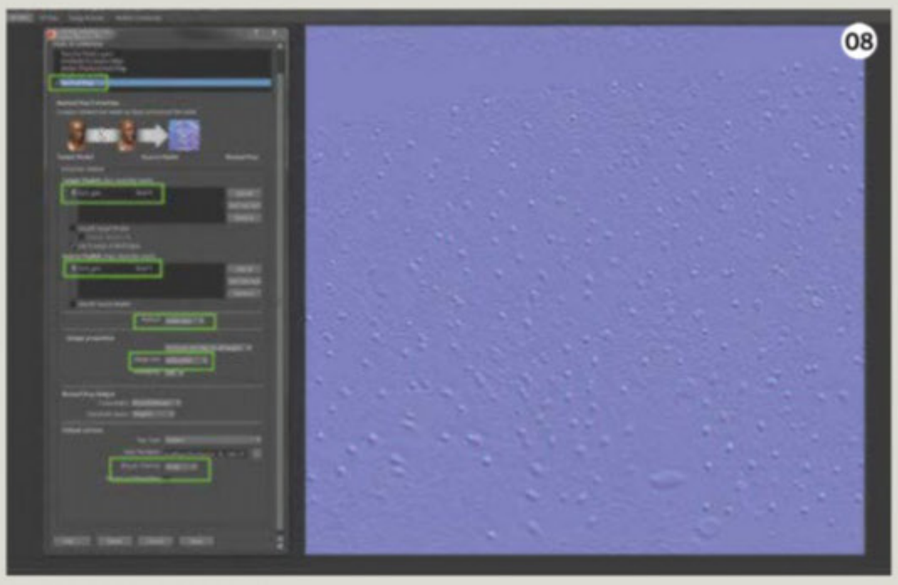
We'll be creating Displacement and Normal maps for the face, the mantle and the tentacles. Let's start by creating a Displacement map for the face. With the face selected, go UV & Maps>Extract Texture Maps>New Operation. Highlight Displacement Map and in the Target Models section, hit Add Selected. Click on Level 0 and change it to Level 1. In the Source Models section, also hit Add Selected and leave it at Level 5. Change the Method to Subdivision and the image size to 4096x4096. Give it a Base File Name such as face_disp_4k_32bit and set it to save as an OpenEXR [32 bit Floating Point, RGBA] (*exr). The Bits per Channel should automatically update to 32-bit FP. Next, disable Preview as Bump Map. Hit Extract and then repeat the step for the mantle and the tentacles and make sure the Target Model is set to Level 1. For the tentacles, I actually had both the left and right tentacles loaded at the same time into the Target Models and the Source Models window. This enabled me to create one Displacement map that could be used on both meshes together.

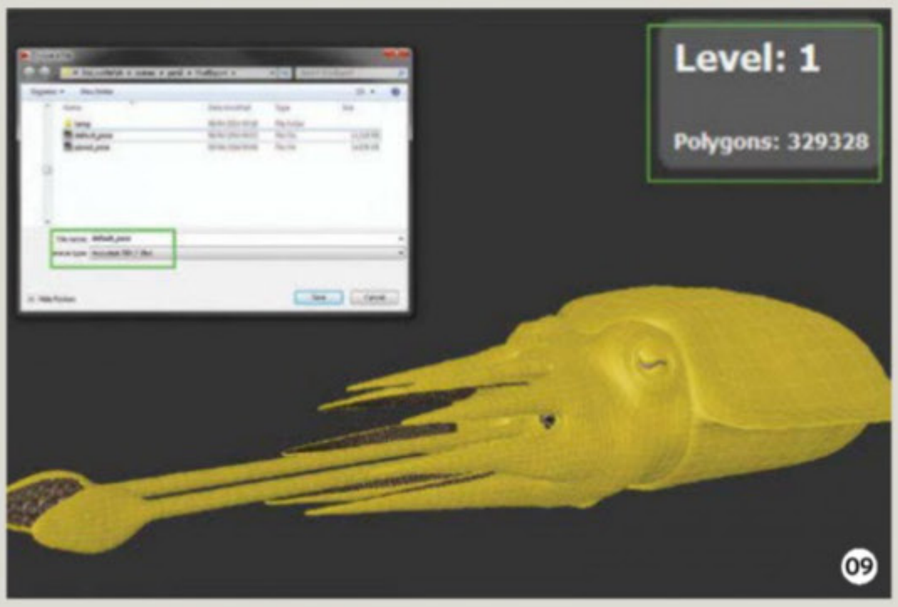
08 Create Normal maps

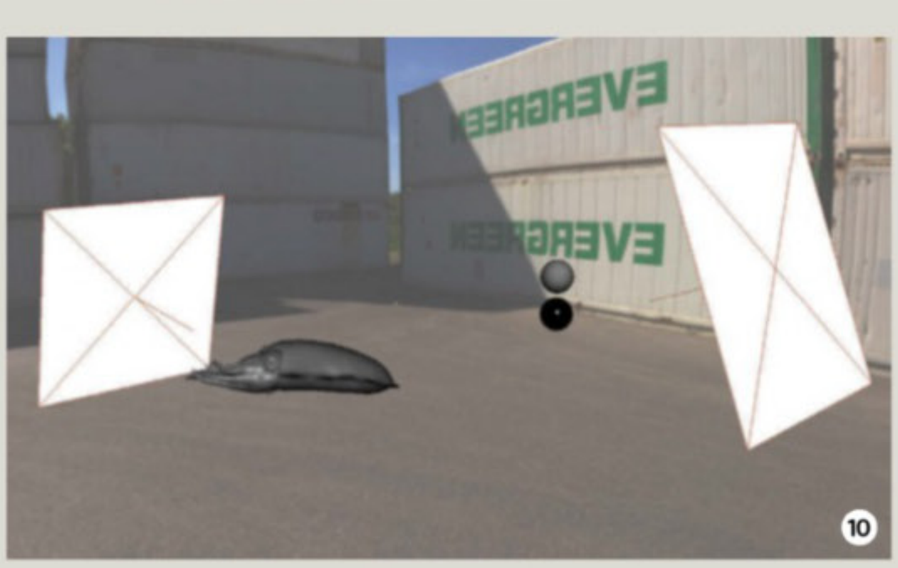
Next, I created a Normal map for the face, mantle and the tentacles. The Target Models were set to Level 4 this time and the Source Models to Level 5. The image size was again 4096x4096 and the Co-ordinate Space was set to Tangent. These files are to be saved out as a TIFF [16-bit Integer, RGBA] (*tif). As the majority of the detail will be created from the Displacement map, we will use the Normal maps as a bit of a kicker to bring out some of the high-frequency details and also to help break up some of the reflections. The files sizes for both the Displacement and the Normal maps are also pretty large, but we can also shrink these down if they have any major implications during rendering.

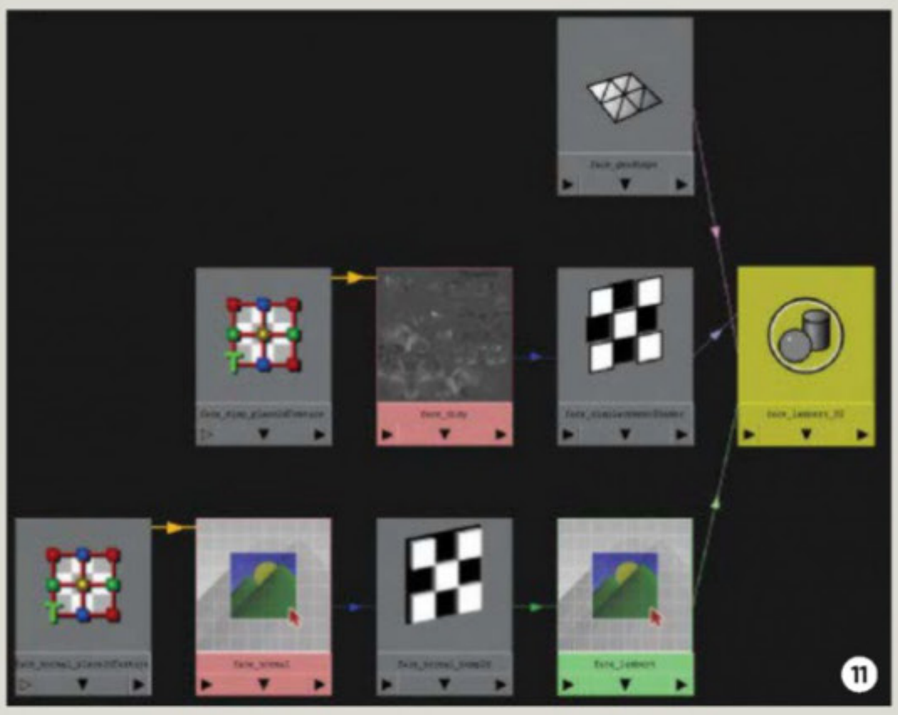












09 Export meshes to Maya

Before creating the texture maps, we want to quickly send the geometry to Maya and test out the Displacement and Normal maps. When creating the Displacement maps, set the Target Models to Level 1. The reason we do this is because through a little testing, I found that it is easier to have the suckers stay constrained to the arms and the tentacles when the mesh is at Level 1. Another consequence of this is that we get more resolution to play with the deformation of the fins. So on that note, set the Level of the face, the mantle and the tentacles to Level 1, and the upper and lower beak, the eyes and all the suckers to Level 0. Next, select all the geometry from the Object List and go to File>Export Selection and save the file as an FBX file and import it into Maya. We should also export out the posed cuttlefish by turning on the Sculpt Layer that we created in the previous tutorial. Apply this as a Blendshape to the default pose, enabling us to transition between the two poses. The only reason we're doing this is because it tends to be easier to capture the character of a cuttlefish with it in pose rather than in its very stiff default position.

10 Use the look-dev environment

I've supplied a look-dev scene that we can do all the testing in for the shaders. As we don't have time to set this up, I thought I would quickly explain what is going on in here. First of all, we're working with a Linear workflow, so all colour images and colour swatches will need to be gamma corrected manually (I've not enabled Color Management in the Render Settings as I like to take care of this myself). Set the File Output to OpenEXR and the Date Type to RGBA (Float) 4x32-bit. In the Render View, set the Display to 32-bit floating-point (HDR) and for the Color Management of the Render View, set the Image Color Profile to Linear sRGB and the Display Color Profile to sRGB. Regarding the lighting, we have three area lights in the scene, including a key light, a fill light (this light has been hidden for now) and a rim light. We should enable the Light Shape for each area light and also plug a mental ray physical_light into its Light Shader. An mib_blackbody has also been plugged into the Color for each physical_light with the Temperature set to 6500. A bit of tweaking of the Intensity values for the mib_blackbody nodes will be needed to suit your needs. Finally, we should also add a HDRI (container_free_Ref.HDR) to create some ambient lighting in the scene and enabled Global Illumination and Final Gathering in the Indirect Lighting tab of the Render Settings.

11 Test the Displacement maps in Maya

Bring the cuttlefish geometry into the look-dev scene and start by applying a new Lambert shader to the face geometry. As this is a test for Displacement, don't worry about gamma correcting the colour of the material for now. We should, however, take the Color Value down to 0.25. In the Hypershade (Window>Rendering Editors), rename the new shader face_lambert and go to the Shading Group tab to rename this new shading group as face_lambert_SG. Select face_lambert_SG and click on the chequered box on the right-hand side of the Displacement material attribute. When the Create Render Node window pops up, select Displacement from the Displacement menu. Rename the displacementShader1 to face_displacmentShader and then click on the box next to Displacement. This time, when the Create Render Node window pops up, select File from the 2D Textures menu. Rename the file1node to face_disp and set the Type to Off. Click on the file icon next to Image Name and then select the Displacement map that we created earlier for the face. You'll find the one I created in the SourceImages>displacementMaps folder within the supplied project directory. Scroll down to Color Balance and turn on Alpha in Luminance. Do a test render to see the result. If it needs tweaking, in the Attribute Editor, go to the Feature Displacement tab, which is under the shape node of your object. If the results are still not what you expect, turn Off the Feature Displacement and use the Approximation Editor under Windows>Rendering Editors>mental ray.

12 Add a Normal map

Now let's use a Normal map on top to bring out some of the finer details. Select face_lambert and click on the chequered icon next to Bump Mapping. Select File in the Create Render Node window and then rename the bump2d1 node to face_norm_bump2d and change the Use As to Tangent Space Normals. Click on the Input arrow to the right of the Bump Value to pop into the file1 node. Rename this node face_norm and change the Filter Type to Off. Click on the folder icon to the right of Image Name and Normal map that we created previously. Rename the place2dTexture1 node as face_norm_place2dTexture. Do another test render to see if everything works and then repeat the steps for the mantle. Later on, we will plug the Displacement and Normal maps into the final shaders, but the process will be the same.

Back to basics

13 Create Color maps in Mudbox

Let's pop over to Mudbox now and create the Color maps. There is heaps of reference online for the patterns that cuttlefish can produce with their skin, so I first did a little search to find some that seemed interesting. I ended up going for the zebra-like pattern on the mantle with spots and stripes on the face. To do this, start by creating a new Diffuse Paint Layer (4096x4096, TIFF [16 bit Interger, RGBA]) and flooding it with a base yellowish colour. After this, use the Airbrush tool with a very low Opacity and start spraying different shades of oranges, reds and browns onto the geometry. Once the base coat has been laid down, create a few more layers to add further variation of colour onto the model, again using the Airbrush tool. It's worthwhile to mix it up with some of the stencils in Mudbox to add further texture to the Diffuse channel. Take advantage of switching the material properties with the Material Presets to get a fresh look on the texture. You may find it useful to turn on Flat Lighting (Shift+L) here and there so that you can focus your efforts purely on the colour information.

14 Continue creating Color maps

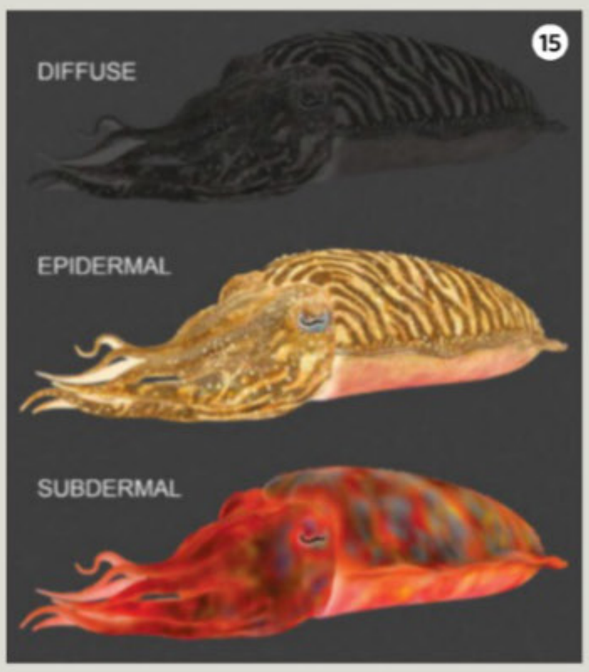
Once happy with the base coat, create a new paint layer and paint in the stripes on the mantle and the face. These should be painted using the basic Paint brush with a Stamp attached to it to give it some noise. Following on from this, add a new paint layer and paint on tiny spots throughout the model with the use of the bw_pores stencil. A multitude of colours can be painted on as spots, ranging from whites to blacks, browns, reds and oranges. This will really help to bring further noise and interest into the Color map. Every now and then, tweak the overall colour and tone of the layers and the Saturation by Ctrl/right-clicking over a layer and using the Adjust Color tool. The Dodge, Burn and Contrast tools also come in handy to spice things up. There's a lot of back and forth at this stage to get the desired result and much iteration, so have a good experiment until you are happy with the overall look and feel for the cuttlefish.

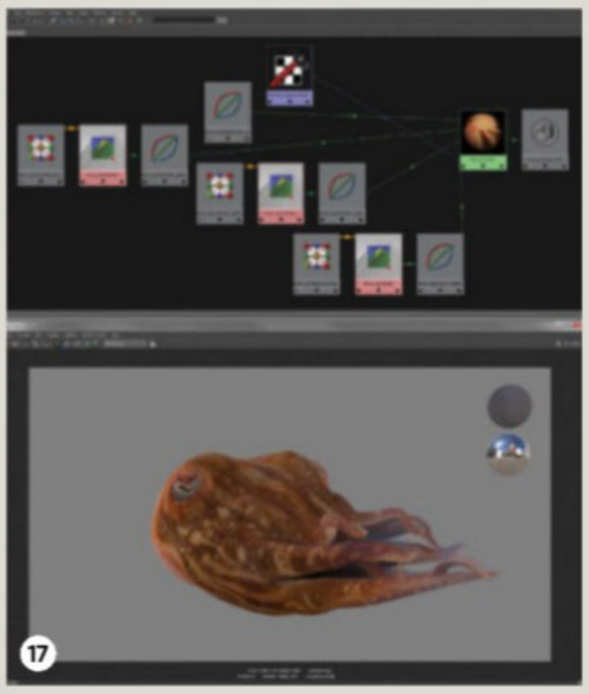
15 Create Diffuse and Subdermal maps

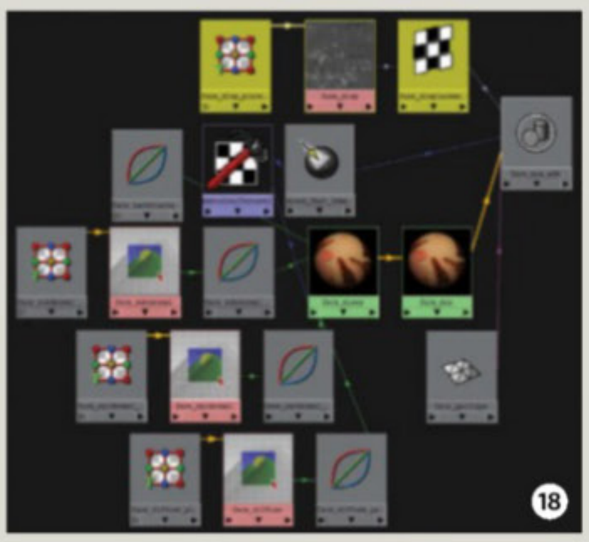
The current map will actually be used as the Epidermal map for our SSS shader in Maya. Usually I would desaturate this map, but I found I got better results by leaving it as it is. To create the Diffuse map that we will use for the SSS shader, merge the visible layers of our Diffuse channel in Mudbox and then duplicate it. Rename the duplicated channel as Epidermal and leave it as it is. Use the Adjust Color tool to lower the Saturation of the Diffuse channel so you have a map that is pretty much a greyscale image. Duplicate this, then select the Epidermal map and duplicate it. Rename the new channel Subdermal and use the Adjust Color tool to crank up the Saturation of this map. Use the Airbrush or the Hue Shift tool to add colour variation to the map. I added plenty of blues, yellows and greens. From testing out the shader, I found the more colour variation in the map, the more interesting the shader became. Last, use the Blur tool to soften the map. In the end, we've created Diffuse, Epidermal and Subdermal maps for the face, the mantle and the tentacles. For the suckers, we only created Diffuse and Epidermal maps. We can leave the eyes and beak as they are since we will add shaders to these. Once you have your maps, export them out as TIFF [16bit Integer, RGBA] (*tif) files and rename them. For example, the Diffuse map for the face was called face_diffuse_4k_16bit. If 16-bit maps are going to be too heavy, 8-bit TIF files should do fine. Sometimes it is worth opening up the images in Photoshop and resaving them, so make sure the compression is set to None.

16 Create Subsurface Scattering shader

Go into Maya so we can start to build our shader. We'll focus on the face here, but apply the same process to the mantle and the tentacles. It's also important to note that although I'll be giving values and settings that achieved the final results, the process of getting there was that of previous knowledge mixed with experimentation. Tweak the values to suit your needs and the look that you are aiming for. Start by opening up the Hypershade and go to Create>mental ray Materials>Misss_fast_skin_maya. Rename the shader face_misss and the Shading Group face_misss_SG. Apply the material to the face_geo and then make the following changes to the face_misss. First, set the Diffuse Weight to 0.4, the Epidermal Scatter Weight to 0.6 and the Epidermal Scatter Radius to 1.250. Next you will want to set the Subdermal Weight to 0.4 and the Subdermal Scatter Weight Radius to 1. Then, set the Back Scatter Weight to 2, the Back Scatter Radius to 3 and the Back Scatter depth to 3. Now you will need to turn Off the Overall Weight for the Specularity as well as the Screen Composite as we will be piping this through an Mia_material_x later on. Now with the face_misss_SG selected in the Hypershade, go Graph>Input and Output Connections. You should now be able to select the misss_fast_lmap_maya1 node. With this node selected, go to the Attribute Editor and enable Include Indirect Lighting, setting the Scatter Bias to 0.2.





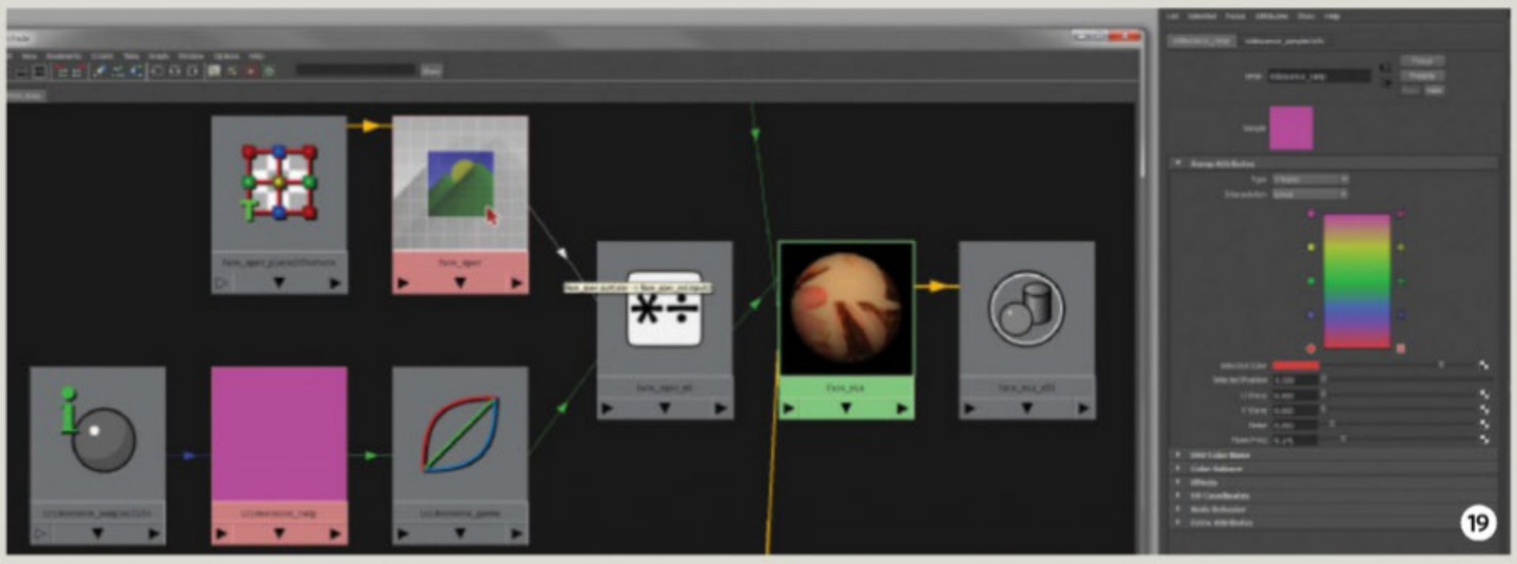


17 Adding the texture maps to the SSS shader

Now we will add the Diffuse, Epidermal and Subdermal maps to the SSS shader. Click on the chequered icon to the right of the Diffuse Color and when the Create Render Node window pops up, select a Gamma Correct node from the Utilities menu. Rename the Gamma Correct node to face_diffuse_gamma and set the Gamma to 0.455, 0.455, 0.455. Click on the chequered icon to the right of Value and this time add a File node from the 2D Textures menu. Rename this node to face_diffuse and then set the Filter Type to Off. Click on the folder icon next to Image Name and select face_diffuse_4k_16bit.TIF (sourceimages>colourMaps). While here, also rename the place2dTexture1 node to face_diffuse_place2dTexture. Repeat the same step for the Epidermal Scatter Color and the Subdermal Scatter Color attributes on the SSS shader. Remember to add the Gamma Correct node with a Gamma of 0.455 and name everything accordingly. For the Back Scatter colour, don't plug an image in. Instead, add a Gamma Correct node, set the Gamma to 0.455 node and simply pick a blue colour for the Value.

18 Combine the SSS shader with the Mia Material X

In the Hypershade, go to Create>mental ray Materials>Mia_material_x and rename it face_mia. Also rename the Shading Group to face_mia_xSG. Select face_mia and in the Attribute editor, set the Diffuse Color to black and then scroll down to the Advanced tab and open it up. Now from the Hypershade, we should middle-mouse-drag face_misss onto the Additional Color of the face_mia. For the SSS effect to work, we now need to hook the Light map into the face_mia. In the Hypershade, select face_mia_xSG and open up the Custom Shaders tab. For the Light Map shader, type in 'misss_fast_lmap_maya1' to the box or middle-mouse-drag and drop the node into this space. We should also plug the face_disp that we created in step 11 into the Displacement material of the face_mia_xSG node. Turn the Reflection off on the face_mia material for now and then do a test render to see the results.



19 Add an iridescence effect

To create the iridescence effect, in the Hypershade, first create a Sampler Info node (Create>General Utilities) and then a Ramp (Create>2D Textures). Delete the place2DTexture node that gets created with the ramp1 node. Rename the Sampler Info node to iridescence_samplerInfo and the ramp1 to iridescence_ramp. Middle-mouse-drag and drop the iridescence_samplerInfo over iridescence_ramp and when the little window pops up, go to Other. The Connecton Editor should open up. In here, connect the facingRatio to the vCoord (open up uvCoord to find this). Now select the iridescence_ramp and click in the ramp to add a few more colour components and edit the colours to include pinks, greens, blues, yellows and reds. Now create a Gamma Correct node under Create>Color Utilities and set the Gamma to 0.455, 0.455, 0.455. Middle-mouse-drag the iridescence_ramp node onto the Value attribute of the Gamma Correct node and then rename this node to iridescence_gamma as well. Now we'll need to go back into Mudbox and take the Epidermal map, duplicate it and then rename it Specular. Use the Adjust Color tool to desaturate it and then paint some extra noise on top of it, then blur it slightly. Save this out of Mudbox and head back into Maya. Still in the Hypershade, go Create>2D Textures>File. Rename the file1 node to face_spec and set the Filter Type to Off. Click on the folder icon next to Image Name and bring in the Spec map that you just created from Mudbox. Now go Create>General Utilities> Multiply Divide. Rename this node face_spec_md and make sure that the Operation for this node is set to Multiply. Drag iridescence_gamma into the Input1 slot on the face_spec_md, and then middle-mouse-drag the face_spec node into the Input 2 slot of the face_spec_md node. When the Connection Editor pops up, connect outColor to Input2. Now, middle-mouse-drag and drop face_spec_md onto the Reflection Color attribute of the face_mia material. Set the Reflectivity to 0.05, the Glossiness to 0.100 and then set the Glossy Samples to 48.

20 Add the Normal map and transparency to the fins

To add the Normal map to the face, simply drag and drop the face_normal node that we created in step 12 into the Standard Bump attribute on the face_mia material. You'll find this under the Bump tab. While editing this shader, scroll to the BDRF tab and set the BDRF Curve to 3 to make it less metallic. Turn on Ambient Occlusion and set the Samples to 32. The last thing we need to do is to add transparency to the fins of the mantle. First, you'll need to create the shader for the mantle, like we did for the face. Once you've done that, head back into Mudbox and create an Opacity paint layer for the mantle. Fill it with a solid white colour and then use a soft black brush to paint around the fins to create the transparency. Save this file out and then in Maya, scroll down to the Advanced tab of the mantle_mia material. Click on the chequered box to the right of Cutout Opacity and select File from the Create Render Node window. Make sure to turn off the Filter Type and then open up the Opacity map. Before leaving this window, scroll down to Color Balance and enable Alpha is Luminance. Now hit Render and let it do its magic. In the next issue we'll be rigging our cuttlefish, tentacles and all!

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How can I create morning dew in 3ds Max?

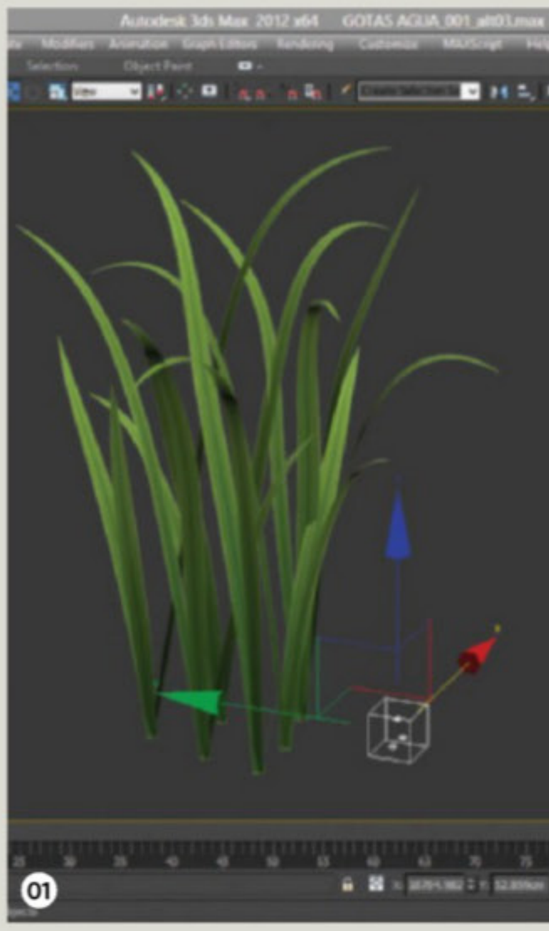
Creating morning dew can be quite a challenge, but using it successfully can really boost the impact of a project. It works especially well on exterior arch-vis projects because this kind of effect adds a more realistic look to a scene – sometimes it can be the final touch that we're looking for to finish off an image.

As is so often the case in the world of 3D art, the morning dew effect can be achieved using various methods. For example, using the Scatter compound is also a feasible technique, using just a single drop of water instanced throughout the grass object.

In this example we are going to use 3ds Max's Particle System. Working with particles is not particularly easy or intuitive due to the huge amount of options, parameters and values to play with, but we can achieve fast and efficient results if we know what parameters are most important to tweak. Experimenting with different objects will help you to understand the difference between Standard Particles and MetaParticles, for example, and will help you to gain the necessary experience for similar situations in future. One thing I learned early on in my career is that we need to be constantly testing new methods and testing our skills to respond to different challenges as and when they arise.

Although the technique that we'll be developing in this tutorial is focused on re-creating morning dew, the idea is quite similar when looking to achieve results such as drops on a can or bottle or raindrops on a window.

Since particles are not editable one by one, at the end of this tutorial we will focus on how to convert particles into an editable poly so that we can change and tweak them as we like, using 3ds Max's own editing tools such as Soft Selection or FFD boxes, or to export as an OBJ file to make it editable in other 3D software. This is great for situations when we need to focus on and enhance a certain element of the morning dew, for example, if we need improve a particular droplet that really needs to stand out in the final image. Nevertheless, the amount of detail will always depend on the image's goal, the client's needs and how much time you have to accomplish them.



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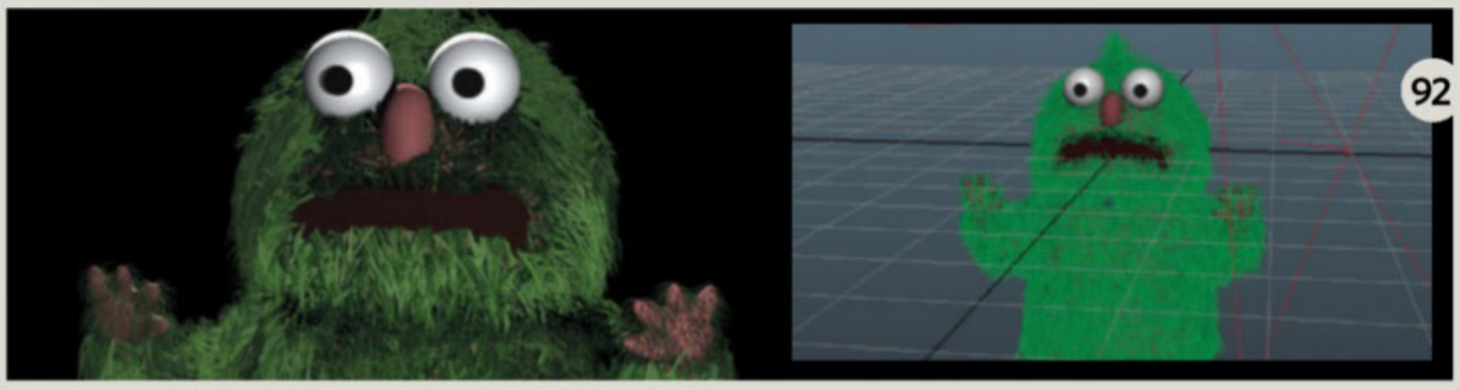

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01 Create the particles

Import the grass model supplied with the issue into your scene. Now go to the Create panel and select Geometry>Particle Systems and click on PArray. Click somewhere near the Grass object and drag it so that the PArray icon appears on the viewport. At this point, go to the Modify panel. In the Basic Parameters, click on Pick Object and select the Grass directly from the viewport. Still in the Basic Parameters, scroll down until you find Viewport Display. Check the Mesh options and write 100% for the Percentage of Particles.

02 Generate particles

Since this morning dew effect is for a still image, we need to set some more options. First of all, select the PArray on the viewport and in the Modify Panel go to the Particle Generation options. Select Use Total and write around 350. You can see there's only a few triangle particles nearby, so we will need to insert 0 in Speed box on the Particle Notion, so they will be attached to the grass. For the Particle Timing, set Emit Stop to 0 as well. Now all your particles should be glued to the grass object.

03 Edit the particle type

To change the particles shape into something similar to morning dew you will need to go to Particle Types in the Particle Type tab and select MetaParticles. Since they have all disappeared at this point, all you need to do is go up to the Particle Size options and insert 0 on the Grow For box. As for the size, that's a personal choice, but I think the best is between 0.25cm and 0.35cm with a variation of 50% so that their Size can fluctuate to create a more random and realistic look.

04 Convert to Editable Poly

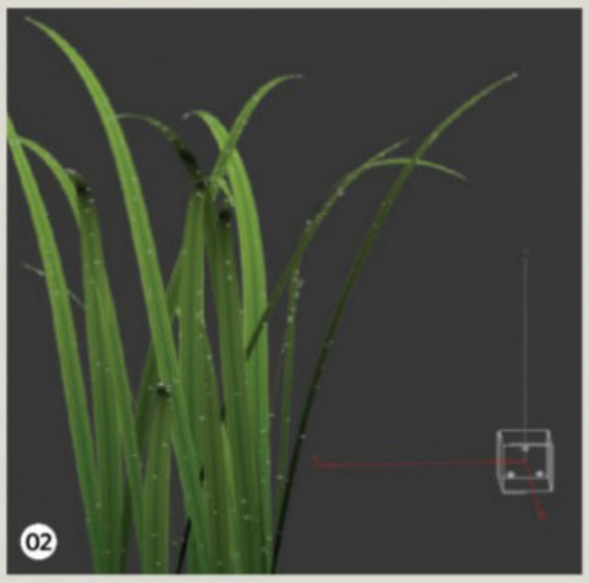
There's no direct option that transforms particles into an editable poly, so we'll need to get around this somehow. Go to the Create panel, select Geometry>Compound Objects and choose Mesher. Click on the viewport and drag it for a bit so the icon will appear. Go to Tools>Align>Align, or use the shortcut, Alt+A. Then, select the PArray icon. Chose X, Y and Z positions with Pivot Point both selected and press OK. On the Modify panel, click on the Pick Object button and select the PArray icon again. Now the Mesher has appeared on the same place as the PArray. Select the Mesher, Ctrl/right-click on it and Convert to Editable Poly.

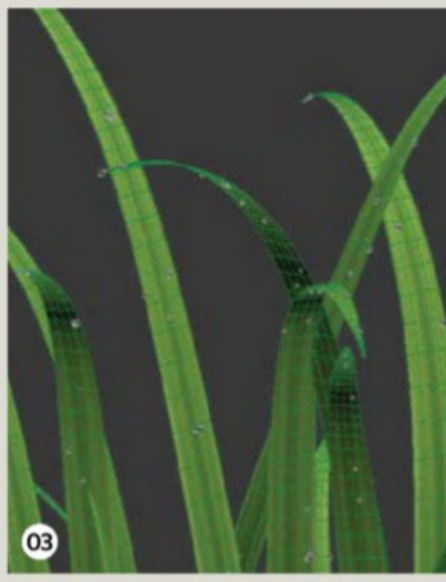
05 Adjust the editable poly

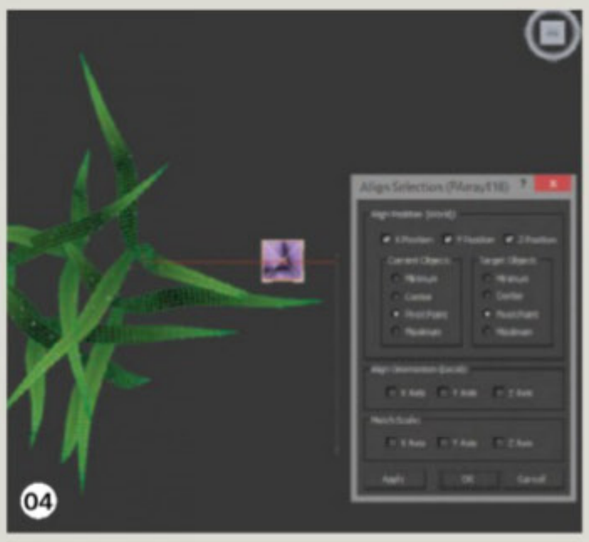
With this new poly you can now delete the PArray particles from the Grass object. Since it's now fully editable you can tweak it however you like, so you can now move, drag, or even scale individual droplets. You only need to go to the Modify panel and select Element. Pick the drop of your choice and transform as you wish. You can also export it and edit it using other software such as ZBrush or Mudbox. Select the Mesher, go to Application Menu>Export>Export Selected, choose OBJ format and save it.

06 Multiply and apply materials

Before multiplying you can create more morning dew using slightly different values, so that when you copy the object you'll have more variety in your final render. You can always rotate and scale the same object throughout the scene to make it different without much effort. For the water material, open up the Material Editor and create a new V-Ray material. Set the Diffuse Color to black and Reflect to pure white and turn on Fresnel Reflections. Go to Refraction options and set the Color to pure white as well, and finally turn on Affect Shadows.

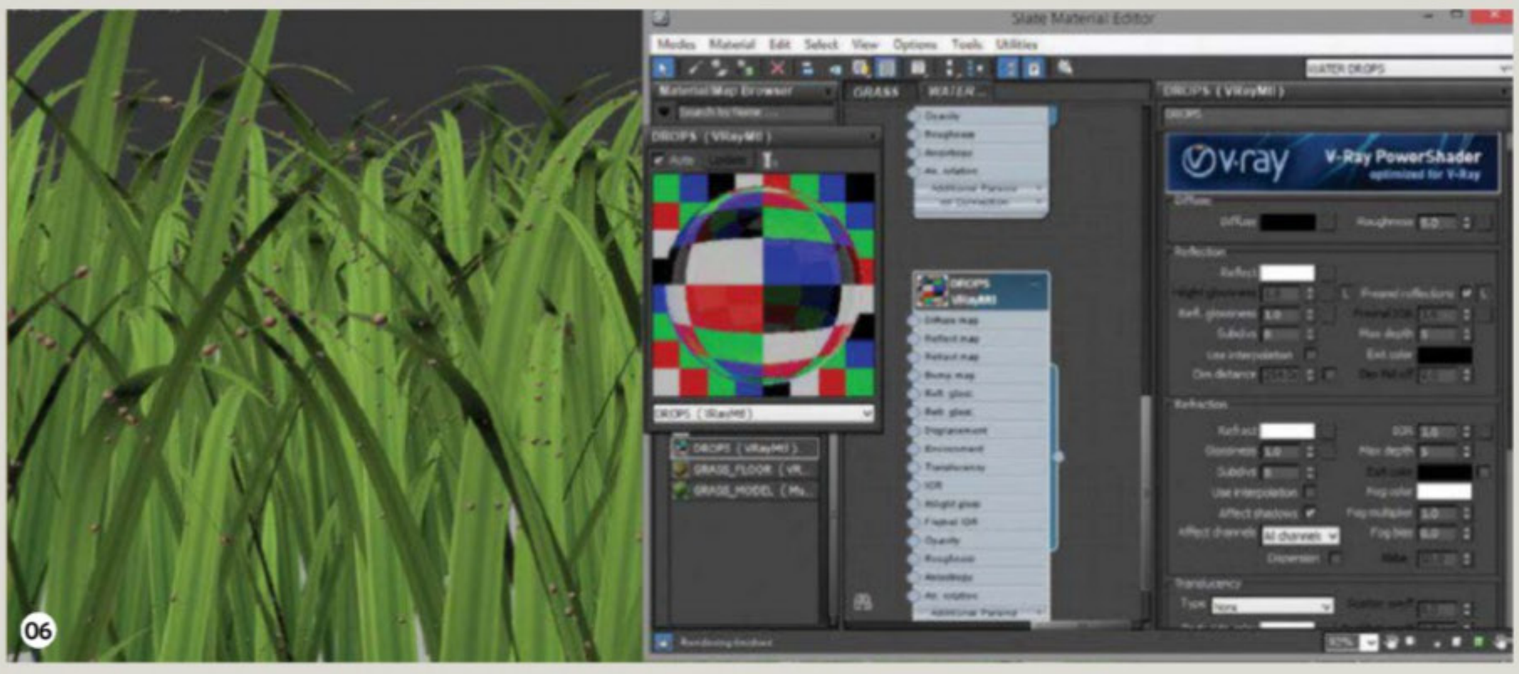






Save your preset

Working with particles can be confusing, and it's easy to lose previously successful results. One way to avoid repeating all of these steps is to practise a few variations and save them as presets with a clear name, so that in the future you only need to load the preset. Select the PArray icon from the viewport, go to the Modify panel, then the Final Options tab and the Load/Save Presets. Enter a name for your preset and click Save. These settings are now saved for a future project.



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ZBrush fibres to Maya

"How can I get ZBrush fibres into Maya for animation?"

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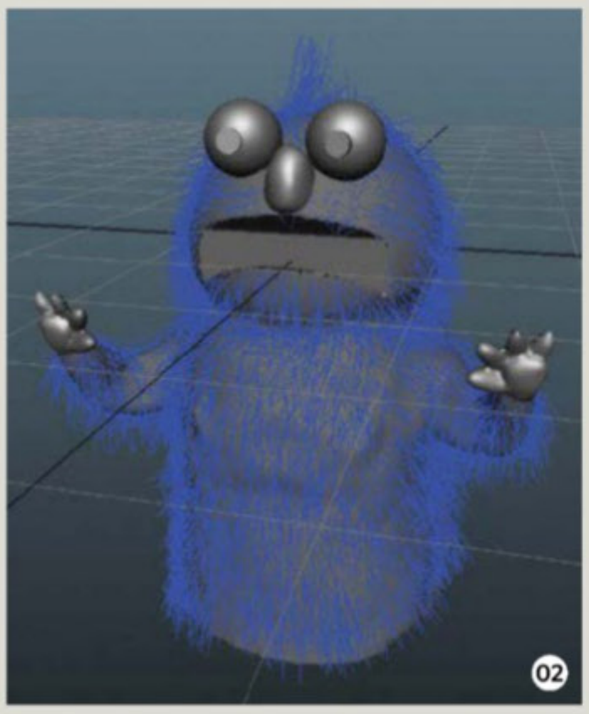
ZBrush is an amazing tool, not just for sculpting, but also for hair grooming. The FiberMesh tool enables you to very quickly and easily make beautiful hairstyles inside of ZBrush – but what do you do when you need to animate that hair style in another program? The GoZ plug-in does a great job of sending models back and forth to other programs. However, using the default GoZ settings will export your fibres as thousands of polygons rather than as control curves that can be animated. The polygon export will not correctly render for the look of hair, but it can be modified and reshaped in Maya and sent back to ZBrush via GoZ. Luckily, Pixologic has created a very handy tool that will let us export just curves that are based on fibres.

Hair can be dense and complex, and Maya lacks built in grooming tools that match the speed and flexibility of what ZBrush offers. An ideal workflow would combine the speed and fluidity of the ZBrush groom brushes, with the ability to animate that hairstyle in an external package. We will do this by using ZBrush to control the shape of the guide curves, and Maya for the actual instancing and the look settings.

Like most things in ZBrush, the fibre workflow is a little different from other hair systems. Once you have accepted the preview settings, the hair can be moved and groomed at will, but it's initial base properties cannot be changed. This is in contrast to a traditional hair setup where the properties can be tweaked at any time. This makes it difficult to establish a non-linear workflow that enables you to keep your creative options open as long as possible. However, once the guide curves are set up and rendering in Maya, it is fairly simple to swap out new sets of guide curves that can be exported from ZBrush.

01 Export fibres as curves

The FiberMesh>Export Curves button is the key to moving curves to Maya. You can select the density of those curves by adjusting the MaxFibers slider before you press Accept. ZBrush sliders define the hair density as a multiple of 10,000. You will want to pick a number that is high enough to capture the detail of your groom, but not so high that it slows your system down. Make sure the FiberMesh>Profile is set to 1, so the hairs will all be flat planes. The Segments slider will control how many individual CVs each curve will be made of. Raising the setting higher will draw the hairs as multi-sided objects, which will be far too dense for Maya. Save your fibre settings as a ZFP file. The setting that controls just how dense your exported guide curves will be is hidden way down in Geometry>FiberMesh >Preview Settings>PRE Vis. When you press the Export Curves button, ZBrush will give you a warning about the number of hairs that will be written out. How high you can make this number will depend on the speed and memory of your computer. Export the curves as either OBJ or MA formats. If you have a complex hairstyle you should break it down into several different polygroups or subtools. Try setting the PRE Vis setting to 10 as a starting point and then work your way up.



02 Curves into Maya

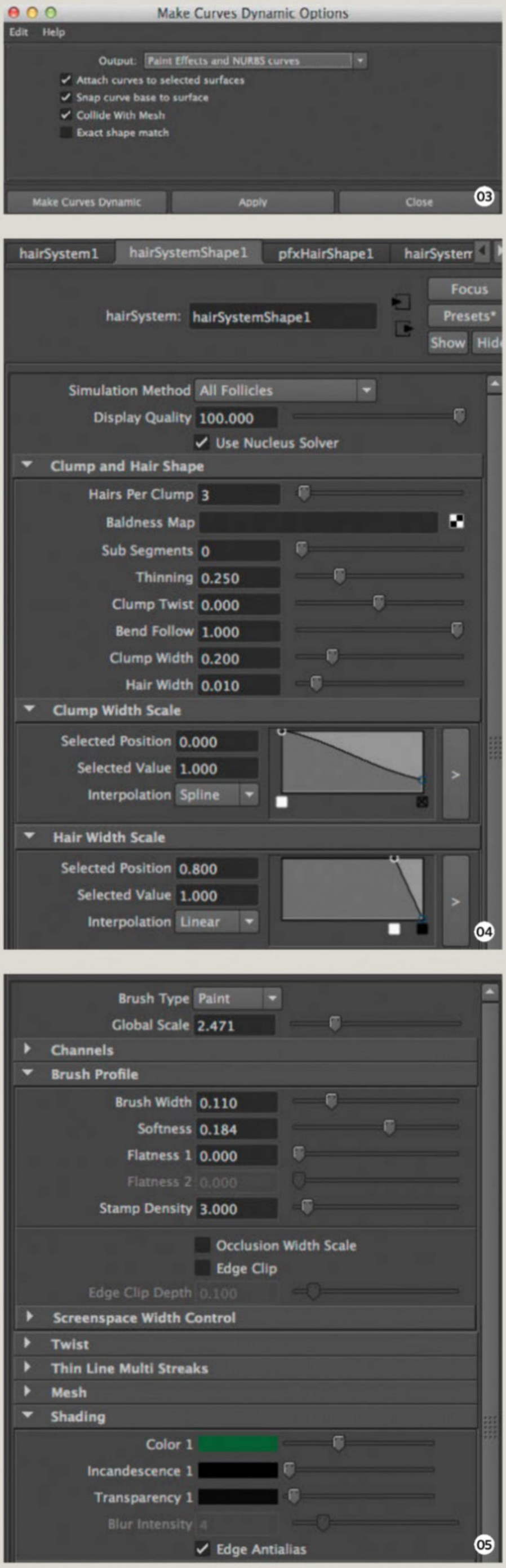
Lower your character's detail level to lowest. This will enable your dynamic simulations to run faster once everything is in Maya. Select Tools>All in ZBrush to export your model and all subtools to Maya. Your ZBrush mesh should now be waiting for you in Maya from GoZ. ZBrush will also export the polygonal version of the FiberMesh. This geometry is useful to make sure your Maya hair occupies the same volume, but for now, just hide it's visibility in Maya. You will then need to import the MA curves file that you wrote out in the previous step.

03 Turn exported curves into nHair

Select your curves that were exported from ZBrush, then Cmd/ctrl+select the base mesh. Go to nHair>Make Selected Curves Dynamic. This will convert the fibres into a dynamic nHair system that can be simulated. Depending on how many fibres you exported, Maya will need to have a good think on this step. Be prepared to sit and wait for a couple of minutes for the hair system to be created.

04 Adjust the hair system

Since we only exported a subset of the overall groom as guide curves, we will need to do some minor reconstruction on the look. The hair density and shape needs to be adjusted in the hairSystem node. A paint effects brush will control the other attributes. Try slowly dialling up the Clump Width control first. This will control the radius of how far around the root CV of an individual hair the clumping will occur. Increasing the Hairs Per Clump setting will determine just how many hairs will be in each single clump.

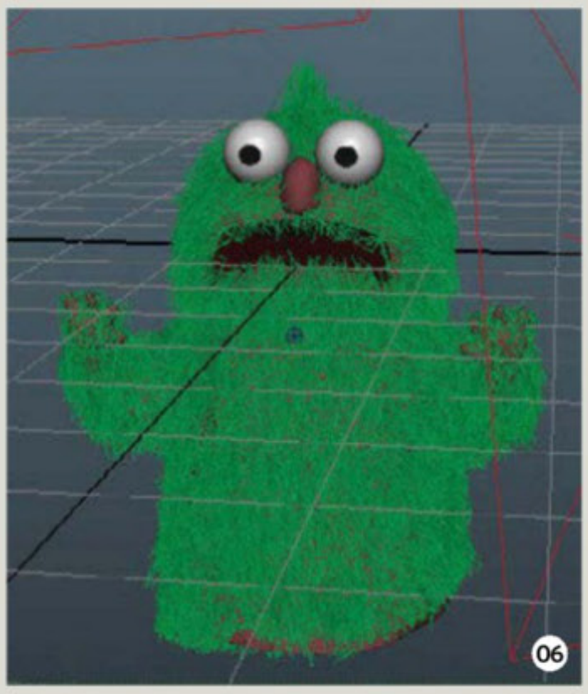


05 Add paint effects strokes to guide curves

Open Windows>General Editors>Visor and pick one of the brushes under the hair section. Now select nHair>Assign Paint Effects Brush to Hair. This will use the guide curves as strokes for paint effects. In the Attribute Editor, go to the PFX Properties and adjust the Global Scale. You can template the exported polygonal hair from ZBrush to help you match up the scale settings. Save your settings as a preset. With the preset handy you can easily re-create your Maya setup if you decide to change something in ZBrush later on.

06 Render

Let's keep things simple and use the basic Maya software render. Shadows are what will make or break the look of hair and give it depth. Do not set the shadow quality of your lights too low because low-quality shadows will chatter and create visible artefacts, which will result in an unhappy client and a re-render. Use Depth map shadows on your lights, and turn up the resolution of the Shadow maps to at least 1024.



Two-way workflow

The polygonal version of the exported fibres is not useful for rendering. However, thanks to the magic of GoZ, you can shape this volume in Maya, and send it back to ZBrush. So, can't get the shape you want in ZBrush? Send it to Maya, deform and reshape it, then GoZ it back to ZBrush and it will update the fibre shapes.

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Samurai
Hasan Bajramovic

I made this...

Incredible 3D artists take us behind their artwork

Artist info

Oscar Perez Ayala

Website http://oscarperezayala.blogspot.com.es

Country Spain

Software used ZBrush, 3ds Max, V-Ray, Photoshop

Bio Oscar is a 2D and 3D artist working in the videogames industry

“The element that I am most proud of would be the central superhero action figure, which I think gives the most strength to the image. I created the base of the figure using 3ds Max, and then ZBrush for volumes and details”

Geek Room 2014

I like superhero action figures and art in general, so I wanted to create a scene in which I could represent all of these ideas together. I got to thinking, what if I put all of these concepts in a room that belongs to an art freak, and who is also a little messy too? That's how I was inspired.

The W9100 is a popular choice for Nintendo and Apple

AMD W9100

With a growing market for 4K, is the W9100 a worthy competitor to NVIDIA's Quadro K6000?

REVIEW BY Orestis Bastounis, technology writer, UK

After years of contraction, AMD is finally on a roll again, landing contracts and deals across the industry. Along with the Nintendo Wii U, both the Xbox One and PlayStation 4 are powered by AMD hardware, while FirePro cards power Apple's Mac Pro workstation.

The company isn't neglecting its desktop component line either. Last year saw the powerful Radeon 290 gaming graphics cards released – the first to use the new Hawaii architecture. With its latest top-end FirePro card, the W9100, Hawaii now comes to workstation GPUs.

The small increment in model name over the previous top-of-the-line FirePro, the W9000, reflects the nature of Hawaii. It's not an entirely new design, as it is still based on the Graphics Core Next (GCN) technology, but it's an evolution of the Tahiti XT chip used in the W9000 – admittedly, on more steroids than the average wrestling lineup.

4K is on everybody's lips, but the consumer market isn't ready to adopt it as standard. Although the cost of displays is falling, there isn't much content to watch on them. Before that content can be made, the tools for editing in 4K need to be available. High resolutions demand more memory and processing power and last year's workstation won't suffice, hence some of AMD's design decisions.

Nearly everything about the W9100 has been given a boost. The core clock speed is actually slightly lower at 930 MHz, but the 28nm chip die is around 50 per cent larger, with 6.2 billion transistors. It's the first single graphics card to have 16GB of GDDR5 ECC memory – the W9000 had 6GB. The 384-bit memory interface has been raised to 512-bit, now delivering 320GB/sec of bandwidth and

On OpenCL

NVIDIA and AMD graphics cards differ in a few ways. The biggest is the support for GPU compute technology, which has effectively split the graphics market in two. NVIDIA's CUDA is widely supported, and only works on Quadro cards, while OpenCL works on both FirePro cards and Quadros, but always seems to perform a lot better with AMD. Our Luxmark tests on the Quadro K5000 came out far lower than with AMD cards.

Since coding for each API is laborious, software developers often have to choose one or the other. Quadro is more popular with high-end workstation users, so many go with CUDA over OpenCL.

Yet, partly thanks to FirePros being used in the Mac Pro and lower prices of the range for PC workstations, it's starting to appear more economical to choose OpenCL first over CUDA, as it provides an easy route to the Mac market as well. The Foundry is one rendering company that has been firm in its support for OpenCL, with MARI receiving a considerable speed bump when OpenCL is enabled in the software.

The W9100 fully supports OpenCL 2.0. This update to the API improves parallelism, which should mean more efficient use of multi-GPU systems – one of the reasons AMD is so keen to push its FirePro certified workstation program, which includes multiple W9100 cards in Crossfire.

there are 2,816 cores, compared with 2,048 before. There are also 64 render output units (ROPs), which is an increase from 32. What's really impressive is that the quoted TDP is relatively unchanged, so there's been a great increase in overall performance per watt.

At the back of the card are six Mini DisplayPort 1.2 outputs, each of which can output 4K at 60hz. You can use up to four W9100 cards in one workstation, giving a total of 24 4K displays, powering more pixels than we'd care to imagine and 64GB of total graphics memory. These type of workstations are aimed squarely at the market currently dominated by NVIDIA's Maximus.

The card's overall processing performance has increased by about a third. The W9000 could manage almost four single-precision teraflops (TF), but the W9100 raises this to 5.2TF. Greater gains are made in its double precision performance, which is up by around 160 per cent, to 2.62TF.

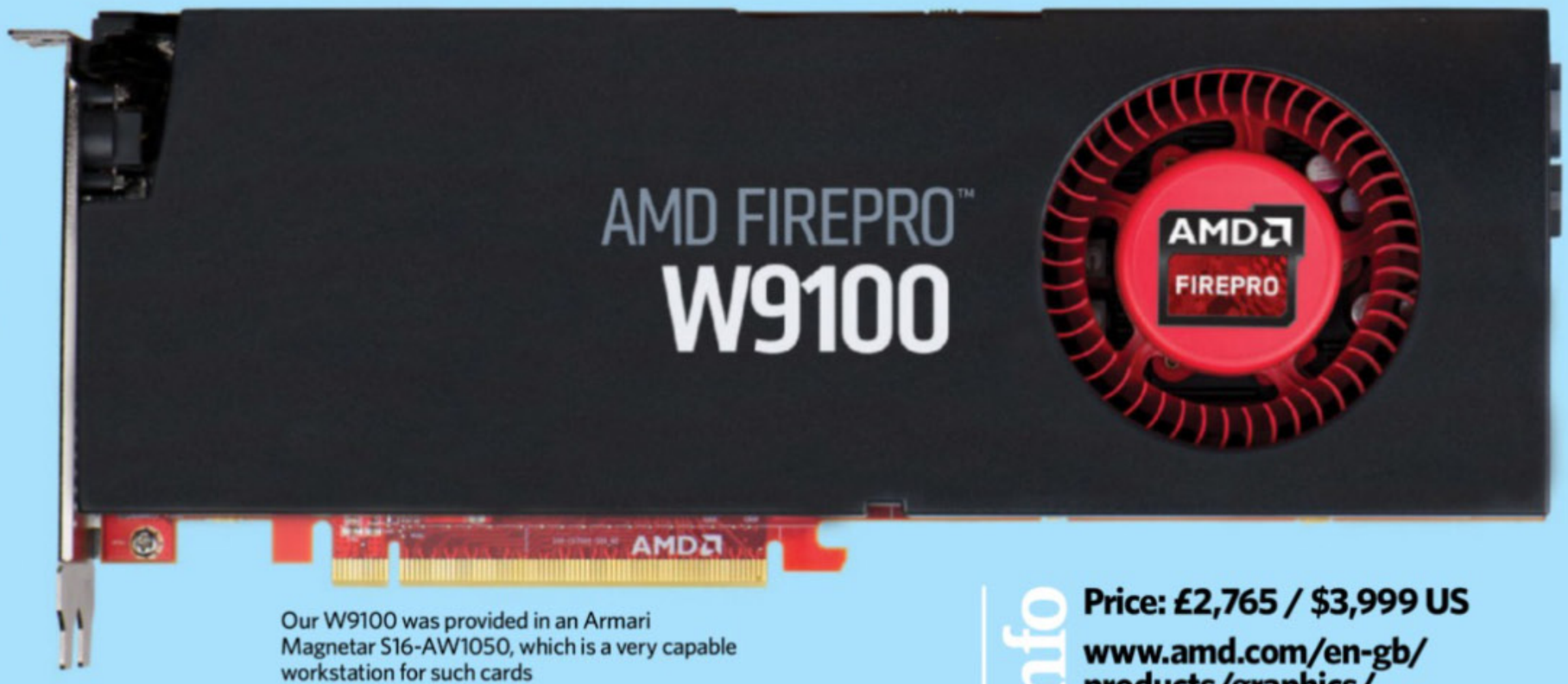
NVIDIA and AMD prefer to send out their top-end cards configured inside a workstation, rather than separately, as this gives them the ability to control the testing environment. We received the FirePro W9100 in an Armari Magnetar S16-AW1050 with a six-core Intel Core i7 4930K processor, overclocked to 4.5GHz. It has 32GB of memory and an Asus P9X79 Pro motherboard.

This type of CPU configuration will push a graphics card more than a Xeon processor. However, production environments are likely to use software that takes advantage of a greater number of CPU cores, with single or dual Xeons running at slower frequencies, so some of these results may be better than you'd get from a typical workstation.

SpecViewPerf12 uses more detailed models than its predecessor, so it's better suited to testing high-end cards. The results were mostly excellent. Some of the SpecViewPerf tests score better on NVIDIA cards, while others really fly with AMD.

We also tested OpenCL performance using Luxmark. The score of 1366 is approximately 33 per cent faster than each FirePro D700 (aka W9000) card managed in the Mac Pro, which is in line with what we were expecting, given the increased core count.

This is still an excellent improvement. Coupled with the increase in memory and generous number of display outputs, the W9100 is leaner and meaner – a welcome upgrade from the W9000. Having that much memory means larger models, more detailed animation and higher resolutions.



Our W9100 was provided in an Armari Magnetar S16-AW1050, which is a very capable workstation for such cards

Although we've established that the W9100 is a speedier than the W9000, the question for any workstation buyer is whether it's a better buy than an NVIDIA Quadro.

The answer isn't clear. Both have their merits and drawbacks. In SPECViewPerf, some test results were better on a Quadro K5000, which costs a lot less than the W9100. The Energy-01 and SolidWorks (SW-03) results were consistently higher on the W9100, despite less memory and rendering muscle being found on the Quadro.

When it comes down to it the deciding factor is the price, with AMD confirming that the W9100 will retail for $3,999. The W9000 is $3,699, while NVIDIA's K6000 is $4,999. Given the overall improvements, the W9100 looks competitive, and offers better value than the competition. Our eyes are now on NVIDIA to see how they choose to follow-up the Kepler workstation GPU line.

The back of the card reveals six Mini DisplayPort 1.2 outputs for extremely powerful results

Test results

SpecViewPerf
Catia-04: 67.02
Creo-01: 36.83
Energy-01: 5.86
Maya-04: 64.02
Medical-01: 45.45
Showcase-01: 67.41
SNX-02: 80.66
SW-03: 69.38

Cinebench 15: 117.4

3DMark
Ice Storm: 128199
Cloud Gate: 30055
Fire Strike: 9153

Luxmark: 1366

Essential info

Price: £2,765 / $3,999 US

www.amd.com/en-gb/products/graphics/workstation/firepro-3d

OPERATING SYSTEMS
- Windows 7, Windows 8

TECHNICAL SPECIFICATIONS
- 16GB GDDR5 ECC memory
- 930 MHz core clock speed
- 2,816 cores
- 176 texture units
- 64 ROPs
- 275w TDP

The good & the bad

- ✓ Large amount of memory
- ✓ Strong graphics performance
- ✓ Strong OpenCL compute performance
- ✓ Six 4K-capable Mini DisplayPort outputs
- ✓ Competitive price
- ✗ Unable to accelerate CUDA software

Our verdict

Features	8/10
Performance	9/10
Design	9/10
Value for money	9/10

"The FirePro W9100 is a powerful graphics card, built for the needs of today's high-res 3D visuals"

Final Score 9/10

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Dell Precision M4800

With its size and power, the portable M4800 puts up a good fight against its desktop competitors

REVIEW BY Orestis Bastounis, technology writer, UK

Dell's website claims the Precision M4800 is the world's most powerful 15-inch mobile workstation. This could be true, since until now, we've been accustomed to seeing such a high-end specification housed inside laptops with larger frames.

There's a Haswell-series Intel Core i7 4900MQ processor, which is a 2.8GHz four-core, eight-thread mobile chip. It's joined by 16B of DDR3 system memory, an NVIDIA Quadro K2100M GPU, a 3200x1800 QHD+ display, a 256GB SSD and 802.11ac wireless.

Unlike the svelte Precision M3800, the M4800 doesn't resemble an Ultrabook – it's more in keeping with the chunkier design of previous Precisions. The chassis is built from an alloy of aluminium and magnesium and there's an array of ports, including four USB 3, VGA, HDMI and DisplayPort video outputs and a 9-in-1 card reader.

It weighs 2.9KG and, with the lid closed, is 40mm high. One benefit of this bulk is the increased space to squeeze in hardware – the built-in optical drive, full numeric keypad and RJ45 ethernet port weren't possible with the M3800's slim design.

It also provides headroom for a powerful GPU. The performance of the 55-watt K2100M snaps at the heels of the K3000M, which was only suitable for 17-inch laptops due to its 75-watt TDP.

The QHD+ display that it comes with has a resolution of 3200x1800 and it's not touch-sensitive, so comes with a matte coating. It's a good screen, with 99% sRGB coverage, 72% NTSC and 77% AdobeRGB, but as we've seen with other hi-DPI screens, Windows programs don't scale well, with unreadable text in many programs such as 3ds Max and Photoshop CS6.

Another downside is how it precludes the use of NVIDIA Optimus in the M4800, a technology that should save battery life by switching to the integrated Intel graphics when the Quadro isn't in use. Overall longevity suffers, even though the M4800 has a 9-cell 97kwh battery. It went from full battery to empty after just 3 hours 48 minutes playing films in Windows Media Player. When tested with VLC, the battery cut out after just 1 hour 40 minutes.

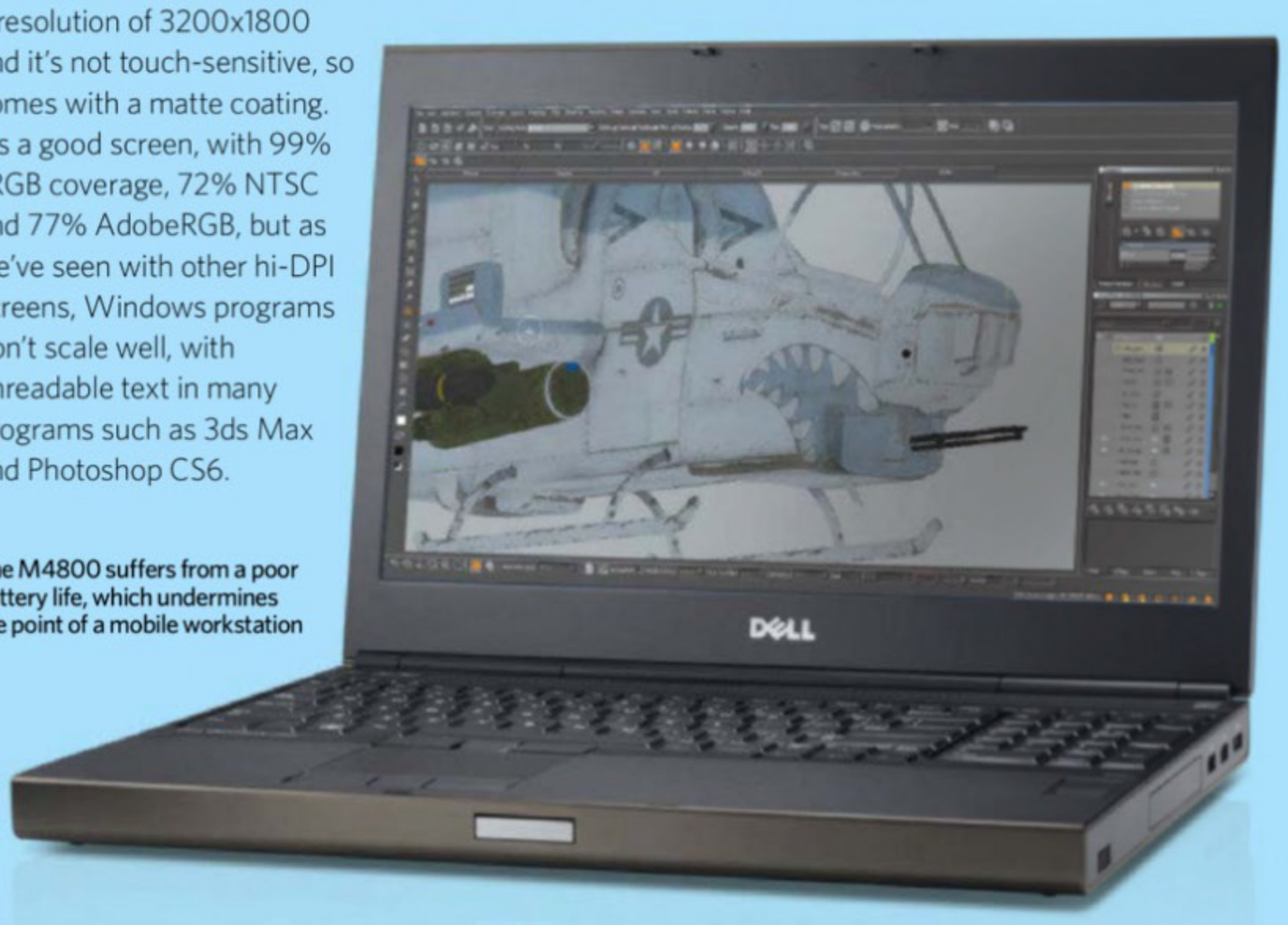
On a positive note, the benchmark results back up Dell's bold performance claims. 3ds Max rendering times are the best we've seen in a laptop, down to 4 minutes 49 seconds to render the Underwater demo scene, which is one minutes less than the M3800.

The K2100M is a great mobile graphics card, with 2GB of memory and 572 shaders running at 667 MHz. SPECViewPerf and Cinebench scores were between 25 and 33 per cent better than the K1100M's.

Despite being a 15-inch laptop, the size of the M4800 makes it suitable as a desktop replacement. The battery life isn't great, but as long as you're tethered to the mains, it enables you to run full design environments.

Note

Since we received the Precision M4800, Dell stopped selling the version with a QHD+ screen and instead it now comes with a 1080p FHD display as standard.



The M4800 suffers from a poor battery life, which undermines the point of a mobile workstation

While the M4800 is bulky, the extra size means top-end components can be squeezed inside

Essential info

Price: £1,431 / $2,590

www.dell.com/uk/business/p/precision-m4800-workstation/pd

OPERATING SYSTEMS

- Windows 7

TECHNICAL SPECIFICATIONS

- Intel Core i7-4900MQ processor (2.8 GHz)
- 16GB memory
- Nvidia Quadro K2100M GPU
- 15" QHD+ display (3200x1800)
- 256GB Samsung SM841 SSD

The good & the bad

- ✓ Powerful CPU
- ✓ Excellent mid-range GPU performance
- ✓ Non-reflective matte display
- ✓ Wide range of ports
- ✓ Sturdy materials
- ✗ Poor battery life
- ✗ Thick and heavy chassis
- ✗ QHD+ display causes problems with Windows

Our verdict

Features	8/10
Performance	9/10
Design	8/10
Value for money	7/10

"The M4800 is a mobile powerhouse, but the poor battery life and heavy frame make it less portable than we'd like"

Final Score 8/10

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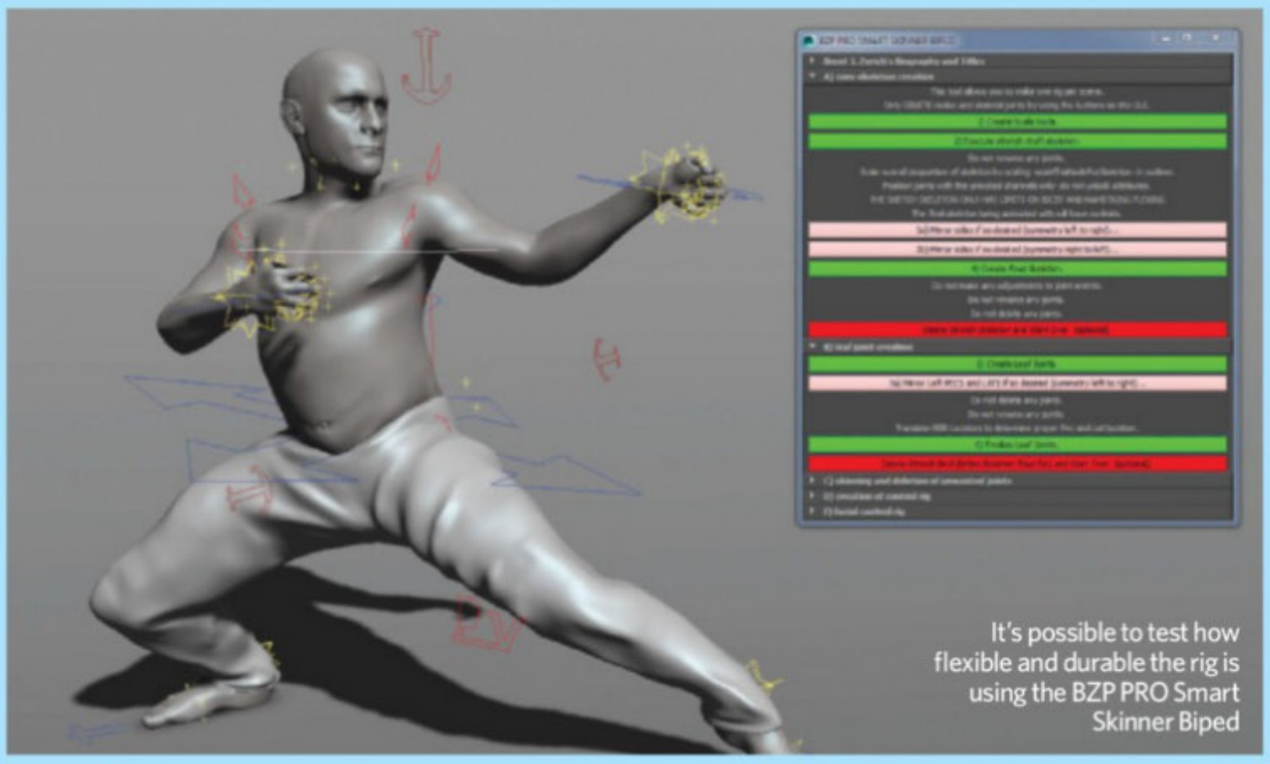


It's possible to test how flexible and durable the rig is using the BZP PRO Smart Skinner Biped

BZP PRO Smart Skinner

How much can you speed up your rigging process using the newly released Smart Skinner from BZP PRO?

REVIEW BY Jahirul Amin, director/producer and associate lecturer at NCCA, UK

I would like to compare skinning to the coffee creams that get left in a tin of Quality Street. For many people, it's the least enjoyable part of the CG pipeline. So when I was given the opportunity to review a piece of software that might make skinning a less time-consuming process, I was more than happy to try it.

The BZP PRO Smart Skinner Biped and Smart Skinner Quad for Maya are all-in-one rigging and skinning solutions. Smart Skinner is the brainchild of Brent Zorich, whose rigging credentials are solid, and this becomes apparent when you use this package.

As soon as it opens up, the Smart Skinner Biped feels immediately user-friendly. Tools are clearly labelled and organised, so you're up and running in no time. There are plenty of training videos on the website and Vimeo, so getting started is a simple affair. The logical, linear nature of the process makes Smart Skinner rather a blessing for those who struggle with technical skills.

The name of this package totally understates its capabilities. Yes, it skins, but you also get a fully-fledged rigging toolkit for your money. The impressive speed of this package became very apparent when I realised I'd forgotten to mirror some joints over, as I was back on track in a moment.

I'll talk you through the processes of this package, beginning with the skeleton. Once you've pressed the button to create the skeleton, it's easily fitted to the proportions of your model by rotating, scaling and translating the joints. Each of the joints will only allow you to manipulate them using a fixed set of attributes that have been locked down, so that the orientation of the joints doesn't lose its integrity. As a result, it does lack some flexibility, but what you lose in flexibility you gain in speed and ease. It is by no means inflexible in other areas, though. During the creation process of the skeleton, you can make it suitable for game, film or mobile. You can also add squash and stretch for cartoon-style setups, meaning a wide range of characters can be rigged.

The skinning functions work well. I tried it out on a mesh of around 60,000 faces, which presented no problem. Once you've done an initial bind, you reference in the BZP PRO skinned mesh and the weighting information is transferred from the file onto your mesh like a skinning transplant. Of course, you'll still have to go in and refine it, but the bulk of the work will have been done for you.

The control rig provides you with all you need to animate a realistic or cartoon-style biped. The twist controls enable you to put the rig into some extreme poses, while still having it deform well, even in tricky areas such as the shoulders and hips. What I will say, however, is that I found the control rig to be visually intense and off-putting due to the busy shapes that were chosen.

All things considered, I am a big fan of the Smart Skinner. In a world where time is rarely on your side, if you can handle the price tag, this piece of kit will come in very handy.

Essential info

Price: £1,487 / $2,500 US

www.bzppro.com

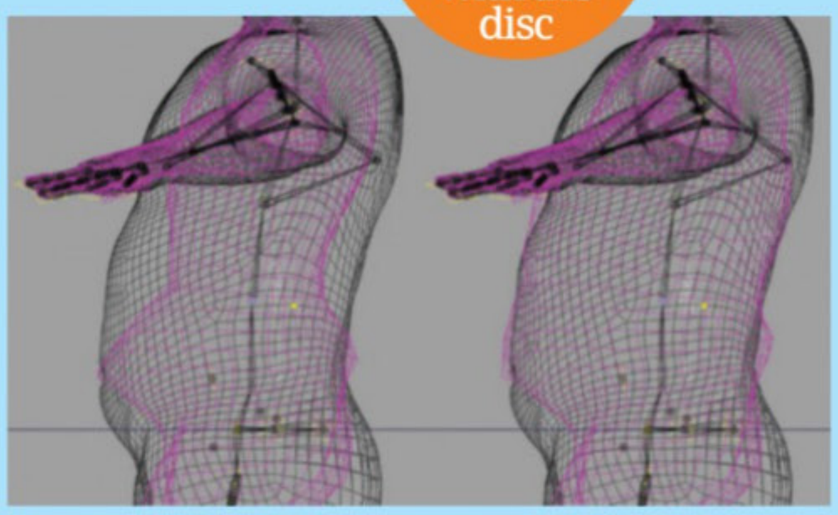
OPERATING SYSTEMS

- Windows
- Mac

TECHNICAL SPECIFICATIONS

- Maya 2012, 2013 and 2014

30 day trial with the disc



To transfer the weighting information, you must fit the reference model into the mesh

The good & the bad

- ✓ Speeds up the rigging process exponentially
- ✓ Creates a solid rig for animation
- ✓ Easy to set up
- ✓ Creates a great default bind with minimal tweaking needed to finish it off
- ✓ Ability to add squash and stretch controls
- ✗ Quite expensive
- ✗ Controls feel a little busy to begin with

Our verdict

Features	8/10
Ease of use	9/10
Quality of product	9/10
Value for money	7/10

"This is a solid solution, which does successfully speed up the character setup process"

Final Score 8/10

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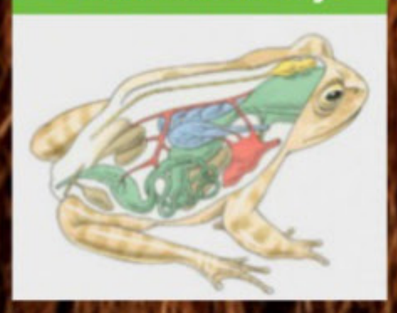

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Ryan Lim

From Korea to Canada, Ryan Lim has come a long way in his journey to senior modeller on *Captain America: The Winter Soldier*

inside

“On-set scanning is the part of the job that I love the most. We get to go to some amazing places”

James Busby Founder of Ten24. Page 108

Scanner Rig
Ten24
This five-person creative collective has put a bold face on the art of scanning 3D humans

To advertise in **workspace** please contact
Ryan Ward on **01202 586415** or **ryan.ward@imagine-publishing.co.uk**

With MARI 2.6, an artist now has the ability to paint detail with PTEX mapping at the same time as another artist finalises the UV layout

New software from The Foundry

MARI 2.6, NUKE STUDIO and MODO 801 released with a host of new and exciting features

The award-winning creator of NUKE, MARI, HIERO and more has certainly been productive of late. At NAB 2014 The Foundry announced a brand new product, NUKE STUDIO, which will give users the ability to work on VFX, editorial and finishing all in one node-based application. Arriving late 2014, NUKE STUDIO will include both individual and a team-based framework that gives the ability to share scripts and work corroboratively with annotations. It will also allow for powerful GPU-accelerated effects to be added directly into the timeline and more, complete with real-time 4K playback.

The Foundry has also announced a new iteration of its state-of-the-art 3D painting and texturing tool, MARI. Now available to download from £1,221 / $2,013, MARI 2.6 offers the ever more popular option of a physically correct real-time shading system, leveraging a BRDF shading technique as seen in modern game engines and renderers used in look development. Other new features include a layered shaders feature, a texture transfer system that enables painting and UV map creation to occur simultaneously, and environment lighting, which enables the use of HDR images to light MARI scenes and to create reflections. You can learn more over at The Foundry's website.

MODO 801

Just as 3D Artist was ready to go off to press The Foundry announced yet another new product – the latest in its MODO line. New features include a nodal shading view, enhanced snapping capabilities, improvement to animation with new keyframing features and much more besides.

To find out more about NUKE STUDIO, visit **tinyurl.com/3DANUKEstudio**, or get your hands on MARI 2.6 at **www.thefoundry.co.uk/products/mari/latest-mari-release**

CGHub shuts down

The premier creative hub for 2D and 3D artists closes its servers

The news was made official in a short statement by the developers of the site, Team Shakuro, on its Facebook page last month. The team apologised to CGHub users on behalf of the development team for it's abrupt closure. The reason behind the decision was stated as being of a personal nature and would remain private.

After much speculation and irate emails from the community, the team followed up with another post in which they explained that as developers, they are not associated with Full Spectrum Digital, LLC, the company that ran CGHub, and that they were simply told the project was over just as suddenly as the users, without having had any say in the decision. As for the reason, it still remains private at the time of writing, though the community is assured it is nothing to do with the SSL bug, or the situation in Crimea, which is where Shakuro is based.

Team Shakuro has stated that it is in the process of planning a new website based on the best elements of CGHub, taking over where it left off. The team has also stated that it plans to launch a Kickstarter campaign to fund the new website, which will be run by the developers as well as potential investors, in order to avoid a similar situation as that which occurred with CGHub. The developers plan to kick things off within the next few weeks.

All CGHub pro members should now be receiving refunds. If you have not received yours, email **refunds@cghub.com** with your account details

● **HAVE YOU HEARD?** • Warner Bros. has confirmed plans for a movie based on the Justice League

To feature in workspace 3D please contact Larissa Mori on 01202 586239 or larissa.mori@imagine-publishing.co.uk

Digital-Tutors bought

Pluralsight has acquired the popular training site

Fourteen years after it was first founded, Digital-Tutors has announced that it has now been acquired by Pluralsight, an online leader in dev and IT training. The Digital-Tutors team will still be working on its 3D training library, joining forces with Pluralsight to enable both libraries to be available to the members of each site with over 3,000 courses.

Furthermore, using the new resources following the acquisition, the instructor base for Digital-Tutors' own courses can now expand even further. There are plans for new releases to rise to an impressive eight to ten courses per week for creative training. Pricing is also changing, with subscription plans being rolled out to include a $29/month (approx. £17) or $299/year (approx. £177) option for a Basic plan with unlimited viewing, but no project files or offline app. For access to everything, there will also be a Plus plan for $49/month (approx. £29) or $499/year (approx. £296) to fully match with Pluralsight's pricing.

For more information about the acquisition, visit **www.pluralsight.com** and **www.digitaltutors.com**

Photoshop 1-2-3 on sale

Imagine Publishing launches a new monthly digital mag

Developed by the makers of 3D Artist's sister magazines Advanced Photoshop, Photoshop Creative and iCreate and available on Apple's Newsstand for only £0.69 / $0.99 an issue or £3.99 / $4.99 a year, Imagine Publishing's new digital magazine Photoshop 1-2-3 is about making Photoshop accessible to all.

"Photoshop 1-2-3 is unique in the market place in that it delivers expert Photoshop advice in easily digested bite-sized chunks," says Editor, Charis Webster. "We've worked hard to create something different, and something tailored to the digital audience. I'm incredibly proud of the team and the final outcome."

For more information and to download a free sample, visit **www.itunes.apple.com** or **www.imagineshop.co.uk**

Project Gooseberry

Blender Foundation's project breaks crowd-funding records

The film will be 100% owned by the makers and everything will be published and shared freely via Creative Commons. **http://gooseberry.blender.org**

Now breaking records as the biggest crowd-funded animated feature film ever, the Blender Foundation's Project Gooseberry will involve 12 indie studios from all over the world. Each using their own styles and cultural influences, they will collaborate online to create a unique feature animation about a sheep called Michel. Naturally, the only software they will have available to them will be open source. So far, funding for the movie has passed the $600,000 milestone after 18 months, with a grand total of $802,729.

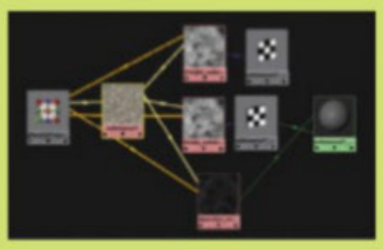
Software shorts

Bringing you the lowdown on product updates and launches

KRAKATOA for CINEMA 4D

Thinkbox Software has launched KRAKATOA C4D, the first version of its high-volume particle renderer for MAXON CINEMA 4D. Key features include point or voxel representation of particle data with various filter modes, motion blur and depth of field effects and integration with the native particle systems of CINEMA 4D for $595 (approx. £354) for a single workstation.

Maya LT on Steam



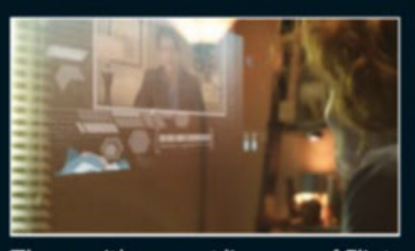
Autodesk has announced that Maya LT 2015 will launch on Steam, bringing the animation and modelling software to an active community of over 65 million gamers, developers and artists to help them create 3D game assets. Maya LT term licenses will be available to buy monthly for £45 / $50 in select countries only.

Otoy previews OctaneRender 2.0

During a presentation at the NVIDIA GPU Technology Conference, OTOY Inc. previewed the forthcoming version of it's OctaneRender 2.0 software, which will include features such as object motion blur, Displacement mapping, and hair and fur enhancements. To follow along with OctaneRender 2.0's progress, visit the OTOY blog at http://render.otoy.com/newsblog.

Smoke and Flame

Autodesk reveals the 2015 Smoke and Flame after Maya, 3ds Max and Mudbox



Those with current licenses of Flint, Inferno, and Smoke Advanced on Linux can upgrade to Flame for free

After the unveiling of it's latest software earlier this year, including the final iteration of Softimage, Autodesk has announced the 2015 Smoke and Flame at this year's NAB show.

The 2013 release of Smoke cut the price of the Autodesk's editing, effects and finishing tool from $14,995 to $3,495. This year's update introduces a subscription-only price model for new customers, for $195/month, $545/quarter and $1,750/year. Meanwhile, the latest version of compositing package Flame includes support for 4K and Ultra HD workflows, plus new tools like 3D Shape and Replica.

DID YOU KNOW? • *Captain America: The Winter Soldier* made $80.26 million after only ten days in China

Project Focus

Pompeii

Paul W.S. Anderson discusses how his lifelong interest with the disaster at Pompeii led him to direct his latest film

MR. X INC.

Project *Pompeii*
Description A period disaster film that revolves around the story of a Pompeii gladiator, who enters a race against time to rescue his true love just as Mount Vesuvius prepares to erupt
Company Mr. X Inc.
Bio Founded in 2001, Mr. X is a digital studio specialising in feature film visual effects and animation. By collaborating with filmmakers from pre-production through to post, Mr. X helps to define the look and feel of a film. Mr. X continues to demonstrate its passion for visual story telling through its work on *Pompeii*
Country Canada
Website www.mrxfx.com

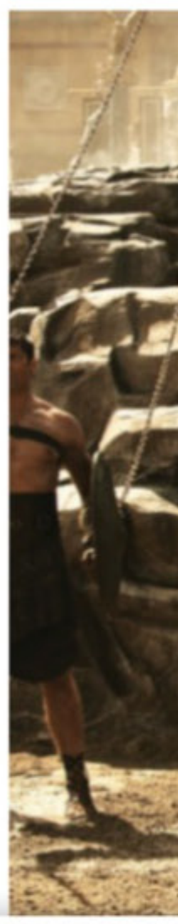
Part-love story, part-epic historical disaster film, *Pompeii* explores in amazing detail the cataclysmic impact Mount Vesuvius's eruption had on the lives of citizens dwelling in the Roman city. "I saw it as one of our challenges, to put the events at Pompeii on screen as it really was – both in the way it looks before the disaster and then during the disaster," explains director Paul W.S. Anderson. "The more we dug into what really happened in Pompeii, the more fantastical it became and it really was something we didn't have to alter too much for dramatic effect, because the true story was simply so dramatic in itself."

Anderson's fascination by Roman culture has been gradually building up, much like a volcano, since he was a child growing up in Newcastle in the North of England, near to Hadrian's Wall. "Romans were a big part of my childhood. Pompeii was taught in school and for a young boy, the combination of Romans and volcanoes was just irresistible."

Having received the green light to go ahead with the film a year ago, Anderson turned to Mr. X for the visual effects, the same team he collaborated on his last four films with. This meant he could trust that the visual effects would be of a high quality and he could focus on the historical details and performances. "Probably the biggest technical challenge was the chariot," he tells us. "That was a mix of real animals with real flame and real sets, and then CG environments and very complicated blends.

"It was our visual effects supervisor, Dennis Berardi, who said to me, 'you have to shoot all the real horse and chariot stuff in the first week of principal photography because if you don't shoot it in the first week, then edit the sequence and give it to me by the second week of principal photography, you'll never make your release date'. That's how complicated it was. I had to commit to handing over the finished cut sequence in just the second week of principal!."

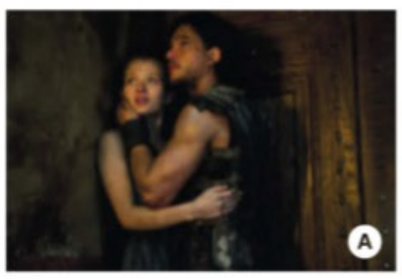
Practical elements were also used to help sell the shots. "It's easier to get real water sloshing around people's ankles than CG water," Anderson explains. "When you go to the wide shots and see a full on CG tidal wave coming down the street it just makes you believe that water effect more. A mixture of practical and CG means your animators actually have practical physics to match to. It's not a matter of conjecture as to what the water looks like, or how it's coloured when it hits the light in the set. They actually have real things to match it to."



> "For a young boy, the combination of Romans and volcanoes was just irresistible"
> **Paul WS Anderson,** director and producer of Pompeii

Contributors

Paul WS Anderson
Director and producer



A Whether it's the mother holding onto her child, the person huddling in terror or the two intertwined lovers, witnessing plaster casts of people frozen at the moment of their death and captured in time spurred Anderson's fascination with Pompeii

B The acting sequences were blocked in on the day and the actors were asked to bring in their own ideas for the shots. However, for some of the larger VFX sequences, a lot of the scenes were locked in stone before any kind of shooting had even started

C The look of the volcano, the explosion and the pyroclastic surge that takes place at the end of the film is all based on real footage that's been shot in the last 15 years. The VFX were compared frame-by-frame with the footage to ensure they matched reality

To submit your project to the **workspace**[3D] please contact Larissa Mori at **larissa.mori@imagine-publishing.co.uk**

C

E

D

A longtime proponent of Stereoscopic 3D, *Pompeii* is Anderson's fourth film to be shot using the technology. "*Pompeii* for me, visually, is a very good use of 3D. I would hope that 3D continuing to be used correctly would mean that, as a format to see a movie in, it will become much stronger in future."

To read more of Paul W.S. Anderson's thoughts on Pompeii and 3D, head to http://tinyurl.com/3DAPompeii

Accuracy is paramount

Paul W.S. Anderson's main instruction to production design, visual effects, cinematography and costume was to make the film as historically accurate as possible

"It's a movie, and not a documentary," explains Anderson. "It's telling a dramatic story, so at times we alter things for dramatic effect. However, I have to say 90 per cent of the time we weren't altering things – we were trying to get things as accurate as possible. That spread into the visual effects as well. We were really trying to make the VFX as photoreal as possible. That was by looking at what was historically preserved in Pompeii and combining that with some of the great volcanic footage that we have been able to access over the last 15 years."

F

D In a 24-hour period, the citizens of Pompeii had to deal not only with the volcanic eruption, but also with a massive earthquake and a tsunami. The challenge was to bring that onto the screen as realistically as possible using visual effects

E For an independent film with a more limited budget than a studio film, one of the biggest challenges was to get the spectacle and scale of the film up on screen. A strict production schedule and a high quality approach to VFX ensured this was possible

F Historical accuracy was a big point of focus for the production. The paintings and frescos in the arena are all taken directly from real paintings that were discovered in Pompeii to really emphasise the reality of the scenes being shot

Studio Access

Ten24

The creative collective puts a bold face on the art of 3D scanning humans

TEN 24
3D Antics
www.ten24.info

Formed in 2008 in Sheffield, England by James Busby, Ten24 is devoted to advancing the art and technology of 3D human scanning and digital asset creation. This five-person collective has earned an expert reputation for delivering highly detailed faces and figures used in videogames, television series, commercials and film projects

www.ten24.info

Clients Axis Animations, BBC, Realtime UK

Country UK

Primary software MODO, LightWave, ZBrush, Maya, Photoshop, AGI Photoscan

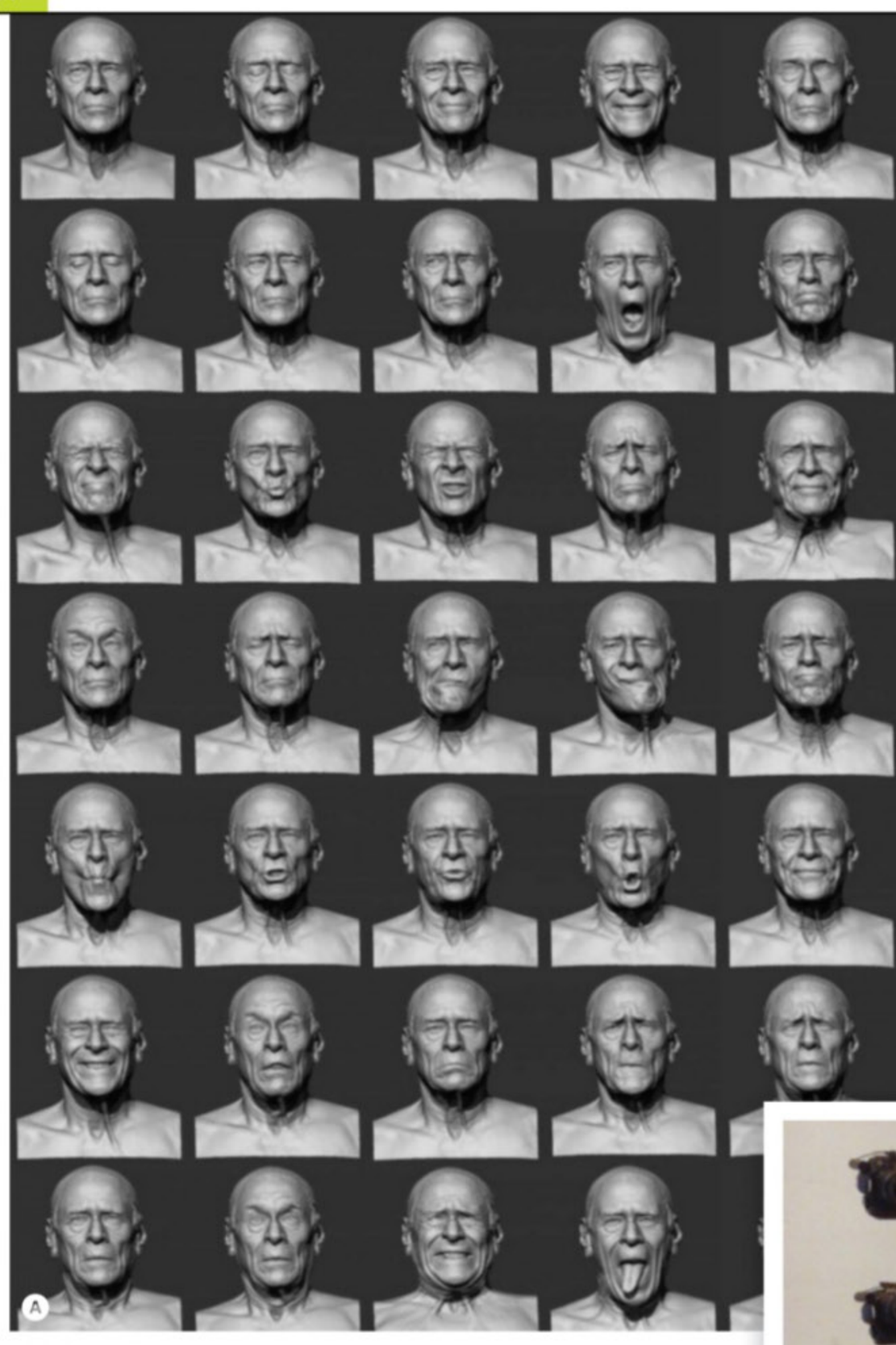
Innovation through experimentation" is how Ten24 founder James Busby describes the ethos of his studio. "We're always messing around with new software and hardware, trying to find new ways to create the best possible content."

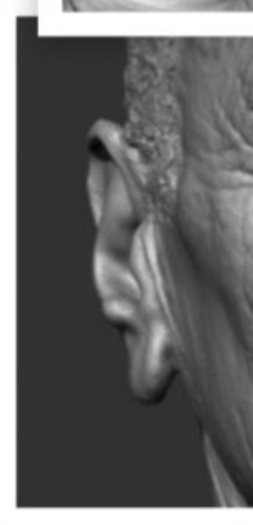
A desire to push the envelope has propelled Busby since the founding of Ten24. Formerly a senior artist at Ark VFX, Busby launched the studio just as the world's economic recession hit in 2008. But Ten24 weathered that challenge thanks to clients like Axis Animation, who came calling with the 'Dead Island' trailer project. "I managed to put together a good team of outsourcers," recalls Busby. "We created zombies, sets, all the main characters as well as a lot of mo-cap clean-up and facial expressions." The quality of the assets created by Ten24 rewarded the faith that Axis showed in Busby's fledgling studio. "It turned out to be the most-viewed cinematic trailer of all time," he says.

Busby's vision of Ten24 as a creative collective is an idea that has endured. "Ten24 doesn't have employees," he explains. "There are five of us in the studio, which is now split into two separate operations. Ten24, the original outsourcing studio, now deals solely with modelling, animation and content creation jobs. Ten24Media focuses on 3D scanning and high-end character creation and is run by myself and Chris Rawlinson."

Physically, Ten24 occupies two locations. In addition to a production workspace, there's a large scanning studio that houses the company's capture equipment. "The scanner itself is a bit of an organic setup in that it changes a lot depending on what we are scanning," Busby explains. "Basically, it consists of a large ring of cameras, which are positioned in such a way that we can capture as much detail as humanly possible." The precision of what Ten24 can accomplish was recently seen in the photoreal humans captured for the 'War Thunder' game trailer created by Realtime UK.

Ten24 has also developed the capability to bring its scanning technology on-location instead of requiring the client to go to their studios. Axis Animation relied on Ten24 to create a series of photorealistic heads and bodies for the *Halo 4 Spartan Ops* game cinematics and this project prompted Ten24 to bring its photogrammetry system on-location for the first time. "In addition to scanning the main characters for *Halo 4*, we took our rig to the Axis main office in Glasgow, Scotland, and scanned about 20 of their staff for use as background characters," remembers Busby. "This





Contributors

James Busby
Founder of Ten24

> "The scanner itself is a bit of an organic setup in that it changes a lot depending on what we are scanning"
> **James Busby, Founder of Ten24**

Portfolio highlights

Very diverse projects reflect the precision assets delivered by Ten24:

2014 *CSR Classics*
2013 *Drakensang*
2013 *BBC's Atlantis*
2013 *War Thunder*
2013 *Halo 4 Spartan Ops*
2013 *Dying Light*
2012 *Nike Inneva*
2012 *BBC's Merlin*
2011 *Dead Island Cinematic*

A The Ten24 3D Scan Store includes a set of 38 aligned and stabilised human expression scans. These are part of what Ten24 considers to be the largest library of high-quality 3D scans available online

B To create these zombies, humans were initially scanned, but the zombie features themselves were sculpted and textured on top using a combination of ZBrush and MODO

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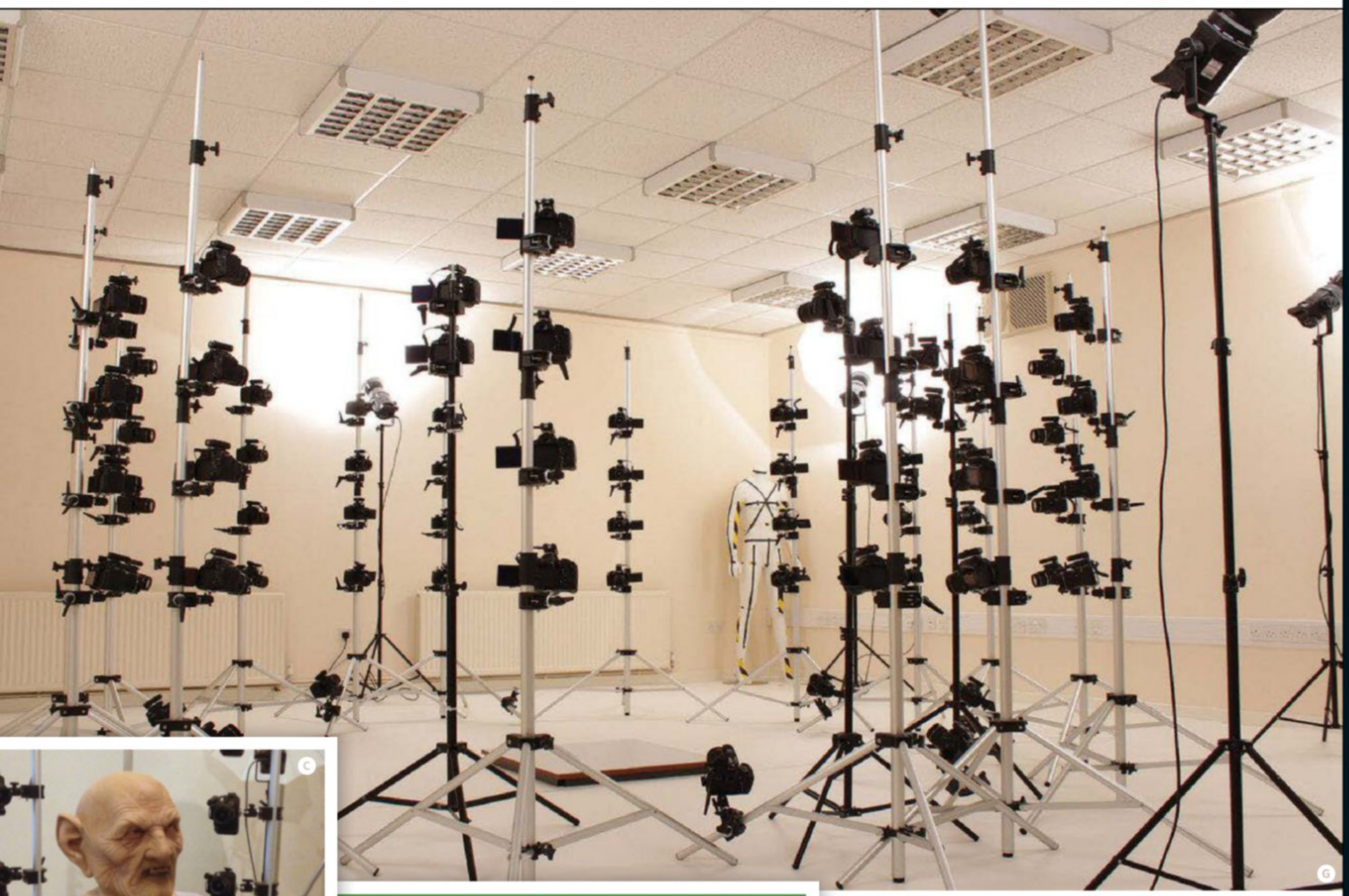
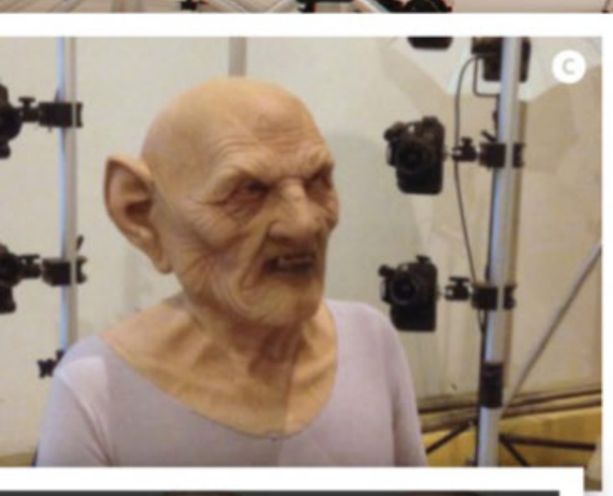




laid the groundwork for our location scanning service." It's a service that Ten24 also provided for the BBC production *Atlantis*.

"On-set scanning is the part of the job that I love the most," continues Busby. "We get to go to some amazing places and diverse locations. We can't say much but we've just returned from scanning our first Oscar-winning actors for a major Hollywood production. It's our first motion picture credit!"

Ten24 has already amassed at least 300 processed scans and over 1,000 unprocessed captures on its server, and it operates a 3D Scan Store to make images available to other artists. Despite this, the company culture at Ten24 isn't all work and no play. "We have a section of the office set up with a big flat screen TV and an Xbox," notes Busby. "We spend our lunch times shooting each other on *Call of Duty*."

C Ten24 took its mobile scanning rig to a soundstage in Wales to scan characters for BBC's *Atlantis*. The minimalist nature of the cableless rig gave them an advantage over similar wired systems

D Ten24 scanned and modelled over 20 heads and characters in Axis Animation's cinematic for *Halo 4 Spartan Ops*, including this scan for a main character. It used an 18-camera rig at Spotlight Studios, Soho

E Ten24 can produce a perfectly photorealistic digital copy of a face or body, right down to the level of detail of pores, along with extremely high-resolution 10,000 x 10,000 pixel texture maps

F In October 2011, Ten24 captured the world's first full-body colour scan slice using AGI Photoscan. Since then, the scanning industry has been built up significantly around this particular software

G Ten24 uses an 80-camera photogrammetry system comprised of Canon DSLR cameras. The cameras are positioned to capture detail and to maintain complete coverage

Industry insider

Ryan Lim

Senior modeller

From Korea to Canada and from games to movies, Ryan Lim is carving out quite a niche for himself

About the insider

Job Senior modeller
Location Canada
Education Vancouver Film School
Website http://ryan3d.net
Biography Ryan Lim grew up in Korea and moved to Canada on a scholarship to the Vancouver Film School. His first job was at BioWare as a game character artist before moving to MPC as lead creature and concept artist. He is now at Scanline VFX, where he worked as a senior modeller on Marvel's *Captain America 2*

Growing up in Korea, Ryan Lim felt a long way from the world of film-making and professional art. He describes himself as one of those kids who had "a passion to draw my imagination on paper all the time. None of my family was involved in art, but they understood me well enough and let me go my way." The lightning moment for him was when he saw Jurassic Park – it was then that he realised what it was that he wanted to do.

He started learning 3D using Maya and was soon producing work good enough that he could enter into international competitions and festivals. He attended the Vancouver Film School and then began a career in game art, but got laid off in 2008 when the financial crisis hit. He decided to "focus on art competitions instead of sending out resumés," which got him an interview with MPC. Landing that gig was his big break – it took him into the movie-side of the industry he had always dreamed of. Now at Scanline, he is an advocate of core art skills and is focused on creating realistic creatures. "I will always keep studying and practicing for many different updated techniques, based on my basic skills," he tells us.

What projects have you recently worked on?
I recently worked on the film *Captain America 2*, doing character modelling. I'm also on *Game Of Thrones* doing concept and environment modelling. Usually the client sends a picture of concept art, which is the starting point and, as the modeller, we give life to the model, moving it from 2D to 3D. Sometimes we match the image pixel for pixel or redesign the concept for animation. On a daily basis I most likely have lots of meetings regarding our work with clients or about realistically developing the model based on our goals.

What exactly would you say are the best and the worst things about what you do?
The absolute best thing is when I get to see the film and check to see just how realistic it is so that I can engage in the movie more actively. On the other hand, ironically, if it's too realistic, people often forget that visual artists were there working on the film to support the movie and make it that much more convincing.

What elements of 3D excite you most?
I'm interested in creature models in films. It's always amazing to see how the technology has improved and how it makes the end result more realistic. ZBrush is my primary weapon as it can express my ideas without any technical barriers. My intention is to capture the detail from ordinary life – if you look at cloth folding or the shape of muscles you'll realise that we're constantly surrounded by art.

What advice would you give to a budding artist looking to follow a similar career path?
I am trying to be a specialist not a generalist, but each department has an infinite depth of knowledge. Many people start out in a modelling career because it's the first thing that they learn, but many people also forget to learn and understand anatomy and structure. If you decide to be an artist, you must focus on these things deeply. Simply put, basic skills always make for good results. Technology is continually changing, but a sound knowledge of basic art remains the same. For example, drawing is the most important basic skill to becoming a truly talented modeller.

Self-taught strategies

From zero to hero in just two years, Ryan began his 3D career by teaching himself Maya

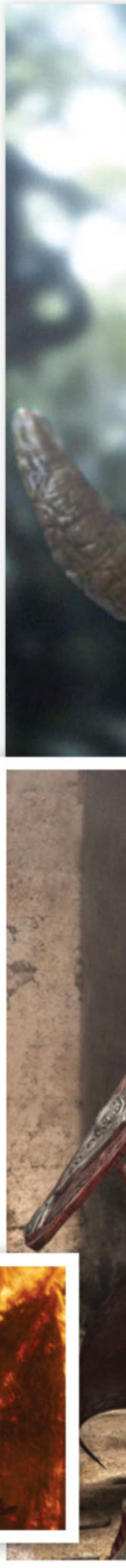
Ryan started to learn Maya in 2001 just after he had finished military service. "In those days I used NURBS for modelling," he explains. "It was a little difficult to understand due to the lack of information and the language barrier." However, he made a one-minute animation after studying for a year, then another year later he made the five-minute piece, 'Crossroad', which got him to the Ottawa Animation Festival.

A

Portfolio highlights

Some recent features that Ryan Lim has worked on:

2014 *Captain America 2* (Scanline)
2014 *The Amazing Spider-Man 2* (MPC)
2014 *300 Rise Of The Empire* (MPC)
2013 *Jack The Giant Slayer* (MPC)
2013 *Man Of Steel* (MPC)
2013 *Elysium* (MPC)
2011 *Journey 2: The Mysterious Island* (MPC)
2011 *Sucker Punch* (MPC)
2006 *Mass Effect* (BioWare EA)



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Ryan Ward on **01202 586415** or
ryan.ward@imagine-publishing.co.uk

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> "Simply put, basic skills always make for good results. Technology is continually changing, but a sound knowledge of basic art remains the same"

A Back in 2010, Ryan Lim worked with MPC to do a series of creature modelling for the film adaptation of *Percy Jackson & the Olympians: The Lightning Thief*

B This modelled version of Conan was created by Lim in 2006. The intricate detail of the armour really emphasises the effort that Lim puts into his creations

C Lim takes the theme known as steampunk to a whole new level, with this brilliantly quirky image from 2008. It's little surprise that it's won awards

D This image, known as *The Monkey King*, is one of Lim's most recent personal pieces, with incredible detail added to the creature's fur, eyes and curling horns

E While at MPC, Limm spent a very long time with his team as the senior modeller on the feature-length film *Man Of Steel*, which included a great many visual effects

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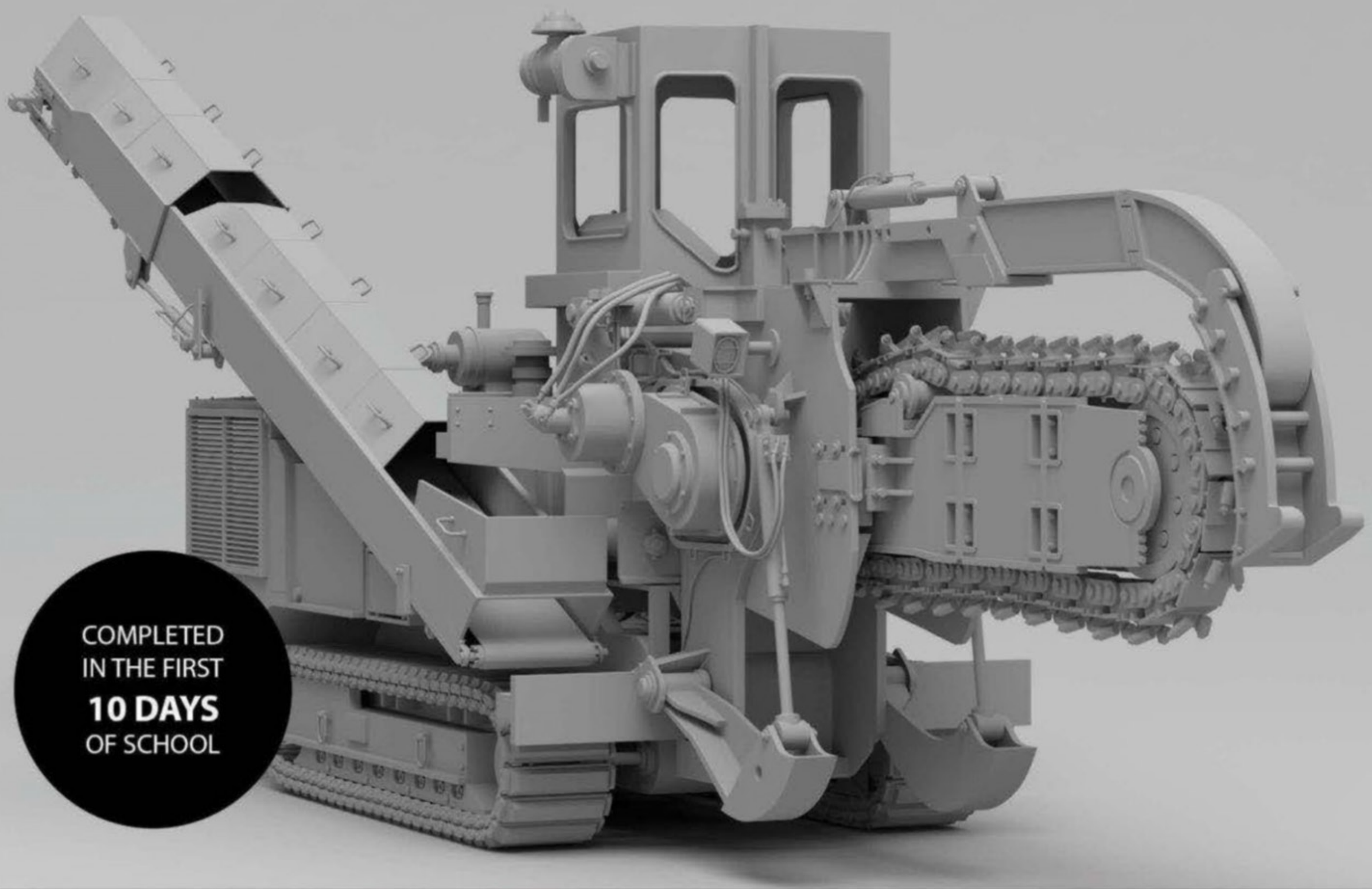

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